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## Original Communications.

### *HYGIENIC THERAPEUTICS.*

### A LECTURE ON AEROTHERAPY.*

BY PROFESSOR DUJARDIN-BEAUMETZ, PARIS, FRANCE.

GENTLEMEN:—Man, attached to the soil, lives at the bottom of an aerial ocean, which has its currents, its storms, its flux, and its reflux, and this vast ocean is the atmosphere. The physician may utilize this atmosphere in the treatment of diseases, and this he effects principally under two particular forms,—either in employing air rarefied or compressed artificially (this is aerotherapy, properly so called), or in utilizing that sum of meteorological elements which constitutes climate (climatotherapy). I propose to devote the last lectures of this course of hygienic therapeutics to these two subjects, and shall begin to-day with aerotherapy.

In holding to the definition which I have just given of aerotherapy, I shall in this lecture leave to one side all that pertains to the atmosphere, its pressures and its currents, and shall concern myself only with the means which have been put in usage to compress and rarefy the air, and to apply this compression and rarefaction to the treatment of diseases. The other points connected with the atmos-

* Translated from advance sheets by E. P. Hurd, M.D., Newburyport, Mass.

phere and its changes I shall consider in the lectures which I shall devote to climatotherapy.

The diving-bell represents the first application of compressed air to the needs of man. The diving-bell was known to the ancients, if we may trust the following passage of Aristotle in his Problems: "The diver is enabled to breathe by means of an apparatus like a tub or brass kettle which is plunged perpendicularly into the water, and which does not fill with water." Even in this age the diving-bell was further improved by constant renewal of the air inside by means of a tube which Aristotle compares to an elephant's trunk. If we may believe Roger Bacon, the ancients must have known the scaphandrum, for Alexander the Great made use of machines "whereby men could walk under water without danger, and learn the secrets of the deep."

However, these facts fell into oblivion, and we must come down to the sixteenth century before we find the diving-bell again brought into use, and this new discovery is attributed to Sturmius. In 1538, in presence of Charles V., some Greeks descended to the bottom of the Tagus at Toledo. The experiment was repeated in 1552 at Venice. But it was an English astronomer, Halley, who was the first to make the diving-bell an instrument of real utility by adding to it an apparatus for renewing the air, and thus enabling workmen to remain longer in the bell without detriment. Lastly, in 1786, Smeaton added still another improvement to the diving-bell, by appending to it a force-pump, whereby a constant supply of fresh air to the workmen might be obtained. It was about the same time (1782) that we see the first attempts made to study the physiological and therapeutical effects of compressed air.

The Society of the Sciences at Haarlem, a city where much use was made of diving-bells in the hydraulic works, proposed at one of its sessions the following subjects as worthy of the careful attention of its members. We present them in the form in which they were put,—a prize was offered to the one who should best meet the desideratum: "1. Describe the apparatus the most convenient, handy, and reliable for making experiments with condensed air. 2. Find out with this apparatus the action of condensed air in different cases; ascertain, moreover, the influence of condensed air on animal life, on the growth of plants, and on the inflammability of different kinds of gases." I do not know what was the result of these inquiries, but, at all events, to the Haarlem society belongs the honor of being the first to attempt an investigation into the physiological effects of compressed air.

Many years later, in 1820, Hamel* made a descent in a diving-bell at Howth, near Dublin, and experienced the painful effects of compressed air on the membrana tympani; he concluded that compressed air might be utilized in the cure of deafness. He remarked, moreover (and this is a point worthy of note), that respiration is easier in the diving-bell than in free air.

Six years afterwards Colladon repeated the experiment of Hamel, and found, like the latter, that compressed air might be utilized in the treatment of deafness, and he adds this remarkable fact, that "one of the workmen, who was habitually short of breath, found himself completely cured after having worked for awhile in the diving-bell." These facts remained unnoticed, and we are obliged to come down to the years 1835, 1837, and 1838 before we see the bases of aerotherapy established in a scientific manner. And while in the great public industries, as in excavations, mining operations, and sinking shafts to great depths, compressed air is employed at strong pressures, according to the indications furnished by the French engineer, Trigér, in 1839, in medicine, on the contrary, but feeble pressure is used.

Three French names are associated with the discoveries respecting the therapeutic effects of compressed air,—Junod, Pravaz, and Tabarié. Junod,† in 1835, communicated to the Academy of Sciences his first work on the physiological effects of compressed and rarefied air, presenting facts which serve as a basis for the method which bears his name. He calls attention at the same time to certain effects of compressed air, and, in particular, its effects on respiration and circulation. "Respiration," he says, "is performed with a new facility; the capacity of the lungs seems to augment; the inspirations are stronger and less frequent." On the other hand, Magendie, to whom was assigned the task of making a report on this subject,—a report which brought the author a prize of two thousand francs,—considered compressed air as susceptible of no good therapeutic application.

Pravaz,‡ in 1837, made known the results

* Hamel, "On the Effects Produced by Sojourn in the Diving-Bell" (*Journal Universel des Sciences Médicales*, t. xix. p. 120, 1820.

† *Archives de Médecine*, 2d series, t. ix. pp. 167, 172; Academie des Sciences.

‡ Pravaz, Acad. Nationale de Médecine, 6th Dec., 1837.

which he had obtained with compressed air, and he dwelt much on the excitation of the digestive organs which goes so far as to give rise to a veritable bulimia; he was one of the first to point out the augmentation in the quantity of urine voided, and especially in the figure of urea. Lastly, he insists, like his predecessors, on the facility of respiration, and this is the way in which he expresses himself: "The consciousness of a fuller, freer respiration is not experienced at the same degree by all persons who are made to breathe compressed air. Those who ordinarily breathe freely and easily hardly notice any difference, but it is not so with sick persons or valetudinarians suffering with more or less dyspnœa, whether on account of some affection of the thoracic organs, or from a state of venous plethora; such patients feel in general a sentiment of extraordinary comfort which, if it continues when they are out of the air-bath, persuades them that they are cured."

Tabarié, who was not a physician but an engineer, and whose researches on compressed air go back to 1832, communicated his writings on the subject to the Academy of Sciences in 1838.* He constructed, first of all, at Chaillot, the model of a bell which to-day serves as a type for the construction of compressed-air cabinets, then he transported it to Montpellier, where Dr. Bertin, one of the professors of the Faculty, was intrusted with the direction of this first aerotherapic establishment, and it is as a result of observations made at this establishment that the latter gave to the profession his work on baths of compressed air.†

Then there happened to aerotherapy what had already happened for massage, and despite the discoveries made in France of the medical applications of compressed air, it was in foreign lands that this method soonest found welcome and attained popularity, and it was among foreigners, too, that the most numerous experiments were undertaken for the purpose of studying the physiological action of baths of compressed air.

In Germany we have seen Lange establish at Johannisberg an apparatus for compressed air, and Rudolph von Vivenot commence in 1860 his physiological researches, which serve as the basis of the magnificent treatise which he published in 1868, and which remains the most complete and most important work on the subject.‡ Sandalh, also, founded in 1862 an aerotherapic establishment at Stockholm, and compiled fourteen hundred and sixty-four observations.§ Then appear the observations of Freud,‖ of Elasser, and especially a remarkable work by Panum,¶ and, finally, the memoir of Von Liebig.** In France, however, the subject was taken up anew, and to the labors of Bertin, of Millet, who founded an establishment at Nice, were soon joined the studies of Jean Pravaz, the theses of Bucquoi,†† of Tronchet, of Torreille, of Crand, of Rouxel, and especially the remarkable volume of Paul Bert, "La Pression Barométrique,"‡‡ which won for its author in 1875 the grand biennial prize of the institute. We may mention, moreover, in this connection the studies of Fontaine and the contributions of Mœller.

It is from the sum of these writings that I shall borrow the principal data of this lecture, thus completing the indications which I have already furnished on this topic in my Clinical Therapeutic lectures under the head of diseases of the lungs.§§

The compression or rarefaction of air in its therapeutic applications is accomplished by two distinct methods: in one the air is compressed in chambers hermetically closed; this constitutes *the compressed-air bath.* In the other system, use is made of transportable apparatuses in which the air is compressed or rarefied at will, and the patient inhales or expires this rarefied or compressed air. I will study under separate heads these two processes of aerotherapy, and I will begin by the most important part of my subject,—namely, the application of pneumatic chambers to the treatment of diseases.

* Tabarié, "On the Effects of Variations of the Atmospheric Pressure on the Surface of the Body" (*Comptes-Rendus de l'Acad. des Sciences*, t. vi. p. 896, 1838).

† Bertin, "Clinical Study on the Employment of Baths of Compressed Air." Paris and Montpellier, 1868.

‡ Von Vivenot, "Zur Kenntniss der Physiologischen Wirkungen und der Therapeutischen Anwendung der verdünnten Luft." Erlangen, 1868.

§ Sandalh, "Om Vermingarne al Fœrtatad luft pæ den Menskliga organismen i Fysiologiskt och Terapeutiskt hanseeden."

‖ Freud, "Erfahrungen über Anwendung der Comprimirten Luft (*Wiener Med. Presse*, 1866).

¶ Panum, "Untersuchungen über die Physiologischen Wirkungen der Comprimirten Luft" (*Pflüger's Archiv für Physiologie*, t. i. p. 125–165, 1868).

** Von Liebig, "Ueber das Athmen intererhörthen Luftdruck" (*Zeitschrift für Biologie*, vol. v. p. 1–27, Novembre, 1869).

†† Bucquoi, "Action of Compressed Air on the Human Economy" (*Thèse de Strasbourg*, 1861, No. 546).

‡‡ P. Bert, "La Pression Barometrique." Paris, 1878.

§§ Dujardin-Beaumetz, "Leçons de Clinique therapeutique," t. ii., 5th ed. Paris, 1888.

All these chambers for the administration of baths of compressed air are of similar construction; they are metallic bell-shaped receptacles of variable dimensions, having an average capacity of eight cubic metres, in which the air is compressed by means of different processes. In some this compression is effected by clack-valve pumps; in others, as in the model of Forlanini, of Milan, water-pressure is employed. Fontaine also makes use of a hydraulic compressor, and it was, as you know, in trying to make improvements on this apparatus that he met his death. In the establishment of my pupil Dupont, which I have shown you, you have seen that his apparatus obtains its compressed air from the street mains, which have their source in the heights of Belleville, and distribute their condensed air as motor power to various kinds of machinery, and in particular to the pneumatic clocks established in our principal streets and public places.

The compressed air enters these "bells" at the upper or under part. In the Dupont apparatus the tube enters by the under part, and through the flooring of the chamber. A tube at the top gives exit to the air, while a manometer placed on one side of the interior of the pneumatic cabinet indicates the pressure of the air contained in the cabinet.

The pressure which is obtained in these air-chambers does not exceed two-fifths of one atmosphere, and varies from twenty-five to thirty centimetres of the column of mercury. Paul Bert thinks that we might use to advantage much stronger pressures,—*i.e.*, from one to two atmospheres; but such pressures have never been employed, and this is on account of the difficulty of having cabinets strong enough to support such pressures. You have yourselves seen how thick cabinet-walls must be made to stand a pressure of two-fifths of an atmosphere. This is the way these baths are taken: the patient enters the cabinet and the door is closed tightly; the room is lighted during the day by dormer-windows,—great plates of glass which are set in the sides of the chamber,—and by the electric lights at night. The patient may read or otherwise amuse himself in the cabinet, which is furnished with a table and with arm-chairs. There are pneumatic chambers so large as to constitute a snug little drawing-room, in which a number of persons may be seated together. The patient communicates with the outside world by means of a telephone. Double pneumatic chambers have even been constructed consisting of two adjoining apartments. The physician may at any time enter the first room, close tightly the door behind him, then, when the air of this apartment is at the same degree of compression as that of the second (as indicated by the manometer), he may enter the apartment of the patient by a second door. One of these models may be seen at Dupont's establishment.

When once the patient is inside the air-chamber, the attendant gradually opens the stopcock which admits the compressed air, and closes the exit-pipe, little by little, by partial turns of the stopcock which governs the issue of the air, till in the course of half an hour the pressure is brought to the point required. Then the patient remains an hour in the compressed-air bath, and at the end of this time an opposite manœuvre is gone through with:—the attendant gradually lessens the quantity of air admitted so as to cause all compression to cease at the end of half an hour; this makes the entire duration within the air-chamber two hours,—one-half hour being consumed in effecting the requisite compression, one-half hour in effecting decompression, and one hour being spent in the compressed air.

The compression, as I have said, varies but little; it is at its maximum when the mercurial column attains thirty-five centimetres; nevertheless, in the first *séances* this degree of compression is not ventured upon, no higher pressures being employed than from fifteen to twenty centimetres, and the degree of pressure being increased by two or three centimetres a day till the maximum is reached. These baths ought to be taken every day or every second day.—It is well understood that the action of compressed air may be supplemented by the admission of oxygen into the chamber, or air charged with balsamic vapors.—Now that you know the arrangement and manner of working of these compressed-air baths, we will go on to the study of the physiological action, and we will examine successively the effects of these baths of compressed air on the respiration, circulation, and nutrition.

In the first observations which were made concerning the physiological action of compressed air, the facility of respiration in these pneumatic cabinets was noticed, and in the short history which I have given you I have shown you that as early as 1820 Hamel emphasized this point, and that in 1826 Colladon remarked this ease of respiration. Since then, all experiments have confirmed the favorable influence of compressed air on the respiration.

I must call your attention particularly to the researches of Von Vivenot in respect to this subject,—researches which have pertained to the respiratory capacity, to the number of inspirations, and their intensity.

Von Vivenot noticed, by the aid of the spirometer, that compressed air augments the pulmonary capacity, and that this augmentation averages $\frac{1}{31.5}$ of the volume of the lung (*i.e.*, 3.3 per cent.); but the most important point, and that which should most interest us, is that this augmentation of the pulmonary capacity is not transient, but is prolonged after the bath of compressed air, and may continue for months if the number of *séances* has been considerable.

Thus it is that Von Vivenot, after having taken in one hundred and forty-three days one hundred and twenty-two baths of compressed air, found his pulmonary capacity, which before the experiment was three thousand and fifty-one cubic centimetres, increased to three thousand seven hundred and ninety-four cubic centimetres,—an increase in the space of three months and a half of seven hundred and forty-three cubic centimetres,—*i.e.*, almost one-fourth more than the primary pulmonary capacity.

With respect to the number of respirations, they are always diminished from one to three per minute; the maximum of diminution was noticed in two emphysematous patients, whose inspirations were 30 a minute before entering the pneumatic chamber, and were reduced to 16 per minute in the compressed air.

Just as was the case with the augmentation of the pulmonary capacity, this diminution in the number of respirations is not transient, but continues for some time after the baths. Thus, in the experiments before alluded to, which he made on himself, Von Vivenot observed that the number of inspirations, which were 16 per minute before the experiment, fell, after the one hundred and twenty-two baths of compressed air, and in the space of three and a half months, to 4.5; and five months after the experiment the number of inspirations per minute was only 5.4.

But if the number of inspirations diminishes, their amplitude increases, and here also Von Vivenot has given us very important data.

He made use of a special apparatus, the thoracometer, which enabled him to observe the dilatation of the thoracic circumference at each inspiration. Before entering the bath of compressed air, the dilatation was 12.39 millimetres; after an hour of sojourn in the compressed-air chamber it was 17.22 millimetres; and at the end of the experiment, 18.14 millimetres; so that, as you see, there was a progressive diminution in the frequency of inspirations, with augmentation at the same time of the depth of each inspiration.

As for the rhythm, Von Vivenot has observed that the bath of compressed air renders inspiration more easy and expiration more slow. While at the ordinary pressure of the atmosphere the duration of inspiration, as compared with that of expiration, is as four to three, in the compressed-air bath it is as four to seven and even eleven.

Panum attains precisely the same results, and the table which I here place before you also shows this augmentation in the pulmonary capacity and diminution in the respiratory movements.

| | Compressed air. | | Normal pressure. | |
|---|---|---|---|---|
| | Quantity of air admitted during each respiratory movement, in cubic centimetres. | Number of respiratory movements. | Quantity of air admitted during each respiratory movement, in cubic centimetres. | Number of respiratory movements. |
| Tranquil respiration... | 631.8<br>745.6 | 13.5<br>10.8 | 563.5<br>679.5 | 14.2<br>11.9 |
| Strong and deep respiration..... | 1326.4 | 8.4 | 1314.6 | 9.9 |
| Respirations as strong and as rapid as possible..... | 2301.6 | 6.4 | 1846.7 | 12.7 |
| Respirations as slow as possible; giving circulation to a minimum of air..... | 1216.4 | 4.2 | 930.3 | 5.8 |

Paul Bert, in the experiments which he made on himself, has also noted this augmentation of the pulmonary capacity. Thus, the strongest expiration which he could make was 3.7 litres. During the compressed-air bath this point rose to 3.99 litres, which corresponds to an increase of two hundred and forty cubic centimetres, or 6.9 per cent. In the case of his laboratory chief, Regnard, this augmentation was much greater, attaining four hundred and fifty cubic centimetres, giving an increase of eleven per cent. But, as Bert remarks, the value of the pulmonary ventilation—*i.e.*, the quantity of air which during each minute traverses the lungs—remains the same; and you readily understand why this is so, if you refer to the experiments before cited of Von Vivenot, which show that if the inspirations are deeper they are fewer.

It is still to the writings of Von Vivenot, and in particular to a monograph which he

published in 1885, that we must refer if we would find the most precise indications as to the action of compressed air on the circulation.*

Von Vivenot noticed, first, the diminution in the number of pulsations; thus, in his own case, before entering the cabinet the radial pulse was 79.3 per minute, and it fell to 75.3 in the air-chamber, and at the end of the experiment—*i.e.*, in an hour's time—it had fallen to 71.66; out of the cabinet the pulse was still 72.41.

This reduction in the number of pulsations was observed in three hundred and seventy-five of the four hundred and twenty-three observations collected by Von Vivenot. In eighteen cases there was no change, and in thirty-nine there was acceleration. The sphygmographic tracing is itself modified. The line of ascension diminishes and is more oblique.

According to Von Vivenot, this slowness of the pulse and this modification in the sphygmographic tracing are mechanical effects, and result from the pressure of the air on the periphery of the body.

This diminution in the number of pulsations has been noticed by almost all authorities, and one of the most interesting observations is that published by Marc, which concerns one of his *confrères* by the name of Stachelauzen, who was affected with pulmonary emphysema, and in whom the diminution of pulse and inspiration was noticed. The following table well shows this double effect:

| | | JULY. | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Pulse. | Out of the apparatus | 90 | 78 | 80 | 80 | 88 | 80 | 78 | 76 | 80 | 80 | 78 | 80 | 80 | 78 | 80 | 80 |
| | In the apparatus | 76 | 70 | 76 | 76 | 75 | 71 | 68 | 66 | 75 | 80 | 72 | 76 | 68 | 68 | 68 | 72 |
| Respiratory movements. | Out of the apparatus | 18 | 18 | 18 | 18 | 16 | 16 | 14 | 15 | 14 | 16 | 16 | 16 | 14 | 14 | 16 | 14 |
| | In the apparatus | 12 | 12 | 14 | 12 | 12 | 12 | 12 | 11 | 10 | 12 | 11 | 12 | 11 | 12 | 11 | 11 |

In his experiments, Paul Bert notes also the diminution of the pulse; thus, his pulse, which before he went into the air-chamber was 76, had fallen to 62 at the time of leaving the chamber; he observes, however, that the same slowing of the pulse has at times taken place when he has remained for some time seated and at rest.

The effect of baths of compressed air on the arterial tension has also been made a matter of study. Von Vivenot made the first experiments in this direction, which led him to the conclusion that the arterial tension is augmented under the influence of compressed air. Paul Bert has repeated these experiments in a manner much more precise, and has shown that the blood-pressure is augmented in compressed air, and that this augmentation is the result of the mechanical action of the compressed air on the surface of the body.

The action on nutrition, which is one of the most powerful of the therapeutic effects of compressed air, is a subject of great interest; and I ask your permission to dwell upon this topic at some length.

Three kinds of proofs have been given as to the favorable action of compressed air-baths on nutrition. Thus, some have found this demonstrated in the increase of urea excreted; others in the augmentation in the quantity of oxygen absorbed and carbonic acid eliminated; others, still, in the augmentation of the weight of the subject.

Jean Pravaz, in his thesis defended October 9, 1875, before the Faculty of Sciences of Lyons, was the first to point out the increase of urea under the influence of baths of compressed air. Subjecting the person under experimentation to a regimen always the same, he has shown that there is augmentation in the amount of urea, and that this augmentation is most marked at the beginning of the compressed-air bath, and is stronger with feeble pressures, of twenty centimetres for instance, than with stronger pressures. According to him, moreover, an augmentation of the temperature of the body follows the augmentation in the figure of urea-production.

Paul Bert, also, has made experiments on animals, and has observed that the sojourn of dogs in compressed air augments the excretion of urea from 8.1 grammes, the average normal

* Von Vivenot, *Virchow's Archiv*, Bd. xxxiv., Berlin, 1865, pp. 515–591.

figure in these animals, to 9.5 grammes after a sojourn of nine hours in the compressed air. Only it must be remarked here, in opposition to the conclusions of Jean Pravaz, that the pressure was very high and equalled three atmospheres.

Georges Liebig* has made a study of the modification effected in the quantity of oxygen absorbed and of carbonic acid exhaled under the influence of baths of compressed air; the average consumption of oxygen at the normal pressure was 7.058, and rose to 7.481 in the compressed air; as for carbonic acid, an augmentation in its production was also noted.

Paul Bert has repeated these experiments, but upon animals, which he made to live in the compressed air, and has also noted augmentation in the absorption of oxygen and in the production of carbonic acid. But this augmentation attains its maximum at about a pressure of two atmospheres, and thereafter there is diminution.

As for the augmentation of weight, studies to settle this matter have been made by Simonoff, director of the aerotherapic establishment of St. Petersburg. According to his investigations and those of Dr. Katschenowsky, if the diet remains the same, the bath of compressed air causes a diminution in weight: but as sojourn in the pneumatic chamber augments the appetite, if the individual is allowed to eat all he wants, a marked augmentation in weight is almost always observed.

These are the results obtained in fifty-three subjects kept under observation:

Thirty-two weighed more after the baths; this increase of weight averaged one thousand and seventy-nine grammes.

In two there was no modification whatever.

In nineteen there was diminution of weight, the average decrease being seven hundred and eighty-six grammes.

As you observe, there is no doubt that baths of compressed air have a favorable action on nutrition; we shall see, as we go on, the applications which therapeutics have made of these effects on nutrition.

Now that you know the physiological action of baths of compressed air, we will proceed to study their applications in the treatment of diseases, and we will follow here the same order which we adopted in considering the physiological action,—*i.e.*, we shall examine first their application to diseases of the lungs, then to disorders of the circulation, and lastly, to consumptive diseases where nutrition is profoundly disturbed. Let us begin, then, with diseases of the respiratory apparatus.

We have seen that the compressed-air bath augments the respiratory capacity; it diminishes the number of inspirations in a marked manner, but augments the depth of these inspirations. This remedial means ought then to be applied in all cases of dyspnœa, and more particularly in the dyspnœa of asthma, where there is always a considerable diminution in the respiratory capacity, and a very pronounced augmentation in the number of inspirations.

It is, in fact, in the treatment of asthma that baths of compressed air have given the best results. But to say that the bath of compressed air is applicable to the treatment of asthma is not enough, and any one that should restrict himself simply to this way of putting the matter would, as Mœller has said, be liable to great mistakes.

Asthma is, in fact, generally nothing but a symptom, and before counselling a course of aerotherapic treatment it is very important to define well the cause of the asthma. In fact, in the so-called essential asthma, aerotherapy has little action; the same is the case with that form which, according to recent works of the German school, is due to disorders of the nasal mucous membrane, where, too, the compressed-air bath is powerless to prevent the return of the paroxysms of dyspnœa. But where this kind of treatment is really effective and curative is in the sequelæ of nervous asthma,—*i.e.*, in combating the pulmonary emphysema sure to follow eventually the accessions of dyspnœa,—and it would be more just to say that baths of compressed air combat the pulmonary emphysema than the asthma itself.

The favorable action of these air-baths is easily explained. In augmenting the depth and amplitude of each inspiration, these baths cause a current of air to permeate the ultimate bronchial ramifications and alveoli and clear them, and they thus enable the pulmonary tissue to regain its primitive contractility. It has, then, been rightly claimed that emphysematous patients have been cured by the use of these baths. But instances of this kind are rare, and oftener relief, rather than permanent cure, is afforded; the relief lasting for some time; and you will see these patients, after a dozen or fifteen of these baths, keep the gain which they have made for several months, and even sometimes for a whole year; and this is readily understood if you remember what I have said concerning the prolonged action of these air-baths on the diminution of the inspirations and the amplitude of the thorax.

* Georges Liebig, *Pflüger's Archiv*, Bd. x. p. 479, 1875.

Therefore, in treating emphysematous patients with asthmatic tendency, you will derive a great benefit from sojourn in the pneumatic chamber, and it may truly be affirmed that these baths, along with treatment by iodide of potassium, constitute the only efficacious means of opposing this pulmonary affection.

In chronic bronchitis, the compressed-air bath may render service, not so much in combating the bronchorrhœa as the emphysema which is so common a sequel of these chronic bronchial and pulmonary catarrhs.

There is also a spasmodic affection of the bronchi which is tributary to this treatment,—namely, whooping-cough ; nor can a satisfactory physiological reason be alleged for the curative effects of compressed air in this disease. Indicated for the first time by Pravaz, then noticed by Sandahl-Brunisch, Lemoroff, Fontaine, Moutard-Martin, the beneficial action of these air-baths in whooping-cough is incontestable. Nevertheless, it is a kind of treatment which is only applicable to grave cases of pertussis, and especially to such as appear in the middle of the winter.

Certain affections of the pleura, and in particular pleuritic adhesions determined by pleurisy, are tributary to treatment by the pneumatic chamber. Baths of compressed air, by augmenting the diameters of the chest, effectively combat the retraction of the thorax, and the impediment caused to the function of the lung by the adhesions. Mœller even thinks that pleurisy with effusion enters into the group of diseases which may be treated by aerotherapy ; he affirms that when the effusions resist ordinary treatment they may disappear under the influence of compressed air. I do not know whether this kind of treatment has been much employed in such cases ; the compressed-air bath, in fact, is hardly practicable except for individuals whose state of health permits them to be readily carried to places where establishments for this treatment exist, and this is quite possible in the case of emphysematous, catarrhal, and whooping-cough patients, but it is altogether different with patients suffering from pleuritic effusions, whom it would be dangerous to carry from their home to the aerotherapic establishment.

Lastly, aerotherapy has been recommended in the treatment of pulmonary tuberculosis, and here the effects obtained consist in a local pulmonary action and a general action addressed to nutrition. In respect to the pulmonary action, the respiratory gymnastics resulting from the bath of compressed air, by energizing respiration in all parts of the lung, and by augmenting the respiratory capacity, combat those pulmonary engorgements and that state of atelectasis so frequently observed in the tuberculous. With regard to nutrition, the effects are still more marked. In increasing the appetite, in augmenting the weight of the patient, aerotherapy enters into the great group of tonic medications, all of which are applicable to the treatment of tuberculosis. Of course, the compressed-air bath has no action on the bacillus and its growth and development. If Paul Bert has shown that these inferior organisms die in compressed air, this only happens under pressures so great as to render life impossible to the higher organisms.

To sum up, in its application to tuberculosis (and here I am of the same opinion as Mœller), aerotherapy constitutes a sort of true respiratory gymnastics, more applicable, however, to individuals predisposed to tuberculosis than to the tuberculous ; it is, in a word, a prophylactic treatment, which, along with kinesitherapy and hydrotherapy, goes to constitute that aggregate of hygienic measures which, in fortifying and modifying the culture-soil, oppose the invasion and progress of the bacilli.

As for the diseases of the circulatory apparatus, aerotherapy has been applied to two orders of affections,—anæmic disorders and diseases of the heart.

As regards the first of these pathological states, agreement is unanimous : the compressed air being more charged with oxygen, on the one hand, and the respiratory functions, on the other, being energized and regulated, there results a more thorough oxygenation of the blood. And just as we have seen inhalations of oxygen act in a favorable manner in the treatment of chlorosis and grave anæmia, so also baths of compressed air have an undoubted beneficial effect in the treatment of these affections. The benefits derived from baths of compressed air are far superior to those of inhalations of oxygen, as the latter are ordinarily practised, and in respect to which it cannot be said that a great quantity of oxygen penetrates the respiratory tree and issues with expiration. This is not the case with the bath of compressed air, which causes the air to penetrate to the ultimate ramifications of the bronchi, and which, in thus augmenting the oxygen inhaled, also augments the carbonic acid exhaled.

The application of the compressed-air bath to chlorosis is one of the first uses which was made of this therapeutic agent, and you ought

always to be able to avail yourself of this means when you are called to treat one of those cases of essential anæmia so rebellious to our other modes of treatment. To augment the curative action of these baths of compressed air in the treatment of anæmia and chlorosis, some have even proposed to change the composition of the air in the pneumatic chambers by introducing oxygen, or by causing the patient to inhale pure oxygen while in the chamber.

As for diseases of the heart, there is far from being general agreement concerning the utility of baths of compressed air, and while some vaunt their good effects, others consider them as disastrous.

This point has been particularly studied by Ducros and Lambert.*

Ducros, basing himself on the physiological effects of the compressed-air bath, which augments the arterial tension, considers compressed air as dangerous in the treatment of valvular diseases. This view is also held by Fontaine, and by Schnitzler, of Vienna.

Lambert, on the other hand, believes, with Waldenberg, in the efficacy of compressed air, and he compares its action to that of digitalis. According to him, the baths of compressed air facilitate the systole. There is diminution in the work of the left heart, and augmentation of that of the right, and this favors the disappearance of pulmonary engorgements and of dyspnœa. Hence in the hypertrophies of the left ventricle good results have been claimed by this means.

In view of these contradictory opinions, I think that it is better to be chary in the application of compressed-air baths to the treatment of valvular affections of the heart, and if in cardiac dilatation consecutive to emphysema and catarrh of the lungs some profess to have obtained benefit from compressed air, owing to the favorable modifications effected in the pulmonary ventilation, it is not so in mitral and aortic lesions, in which this method can only have bad results; and I come now to the effects of baths of compressed air in diseases where nutrition is altered. In this group three affections in particular are tributary to this treatment,—diabetes, obesity, and albuminuria.

It is easy to understand the happy influence of compressed-air baths in diabetes, owing to the oxygenating action of these baths. Hence in diabetes of the obese, where we want to stimulate the functions of the organism and combat the effects of retarded nutrition, we may employ aerotherapy for the same reason that we employ gymnastics and hydrotherapy.

The same may be said with respect to obesity. But here one condition is imperative,—we must subject the patient at the same time to a rigorous alimentary regimen; for if you leave your obese patients to eat whatever and as much as they please, as the bath of compressed air augments the appetite, you will see the weight increase instead of diminishing. In reference to this matter, the observations of Leonide Simonoff are the most exact of any that have yet been made.

In the treatment of diabetes and obesity, another mode of application of compressed air quite different from that of the pneumatic chambers has been proposed. I refer to the air-douches. My pupil, Dr. Maurice Dupont, was the first to attempt the employment of these douches, which are similar to the water-douches, and differ only in the fact that the tubes project compressed air instead of water. These douches produce a sensation of cold and profoundly depress the skin like an energetic massage.

Camperdon has much extolled the benefits of these douches in the treatment of diabetes and obesity. They have, however, come but little into use for the following reason: in order to obtain an energetic action from these douches they must be administered for several minutes, and this produces a degree of cold which is painful, and may determine an intercurrent bronchitis.

Albuminuria is to a certain degree tributary to baths of compressed air, not because they have any effect on the renal lesions, the cause of the albuminuria, but because, as Semmola has shown, the inhalations of oxygen, in modifying the albumens of the blood, oppose the exosmosis of albumen through the renal filter. The baths of compressed air act in the same way, and may cause the albumen to disappear from the urine. But, as I have many times insisted upon in my lectures, the presence or absence of albumen in the urine plays only a secondary rôle in the prognosis of albuminuria; all depends on the accumulation in the economy of toxic products not eliminated.

I must now say a word about the action of baths of compressed air in the treatment of affections of the ear and in surgical anæsthesia.

The compressed-air bath produces a disagreeable and painful sensation in the ear, which results from the slowness with which

* Ducros, "Experimental Study on the Respiration of Compressed Air," Paris, 1875; Lambert, "Clinical and Experimental Study on the Action of Compressed and Rarefied Air" (*Thèse de Paris*, 1877).

the pressure is equalized on both sides of the tympanum, and when the Eustachian tube is impervious, it is easy to understand that this augmentation of tension may cause rupture of the membrana tympani; a rupture, however, which is not itself serious. But it is easy also to understand that when the Eustachian tube is not obstructed, the ingress of compressed air may promote and maintain its permeability, and oppose the congestion of the mucosa, which plays a preponderant rôle in deafness.

The application of compressed air to anæsthesia originated with Paul Bert and Pean. This consists in making the patient inhale protoxide of nitrogen under pressure in the pneumatic chambers. Experiments of this kind, which five or six years ago were considerably in vogue, have been completely abandoned; and although certain parties constructed at great expense at the Hôspice des Quinze-Vingt, under the direction of Fienzal, a pneumatic cabinet in which to anæsthetize patients, this process is no longer employed, for the following reasons: First, because it requires a very expensive apparatus; and, secondly, because this anæsthetic method is not superior to the others in use.

Thus far we have been concerned only with the pneumatic chambers; but there is another mode of application of aerotherapy, which consists in making use of portable apparatuses which furnish both compressed and rarefied air. The type of these apparatuses is that of Waldenberg. This apparatus, as you can see by the specimen which I here place before you, is a veritable gasometer. It is a bell of sheet-iron, which plays up and down in a reservoir of water; pulleys in the upper part of the apparatus enable one to raise the bell, which can also be lowered at will in the water. We have here, in fact, a model on a small scale of those immense bell-shaped receptacles which you see in all the gas-works of the present day.

When the bell sinks it compresses the air contained in its interior, and the patient is made to breathe in this condensed air. When, on the other hand, it rises, the air inside is rarefied, and the patient is made to utilize this rarefied air. The air, thus modified, passes by a flexible tube into a trumpet-shaped mask, which the patient places before his nasal and buccal passages. Such is the essential principle of these apparatuses, which have been more or less modified by Tobold, Bieder, Giezel, Storck, Fraenkel, and especially by Schnitzler and Wiel. These last two physicians have reduplicated the apparatus of Waldenberg,—*i.e.*, they have arranged two gasometers, placed side by side, and constructed in such a way that when one falls the other rises. A somewhat complicated play of stopcocks, similar to a cornopean, enables the mask placed before the patient's mouth to communicate alternately with rarefied or condensed air. In France these apparatuses are manufactured by M. M. Walker-Lecuyer, and, as you have seen, by a play of weights the two gasometers are put in operation, the one rising while the other is falling.

But all these apparatuses are costly, and take up a great deal of room, and can only be placed in the great aerotherapic establishments.

The apparatus constructed by Maurice Dupont, on the contrary, is relatively of small size and of little cost; only, in order to be put in operation, it needs a pretty strong water-pressure, such as is not likely to be obtained except in the large cities. In fact, as you know, Maurice Dupont avails himself of water-power both to compress and rarefy the air of his apparatus. A lever enables the subject to place himself alternately in communication with rarefied and condensed air, and in order to set the instrument working all that you have to do is to open the stopcock which admits the water. There is an exit-tube to carry off the water; and, to complete the apparatus, Dupont has placed on one side of the apparatus a flask charged with medicinal principles through which the air aspirated by the patient must first pass. These are the principal fixed and portable apparatuses now in use to obtain rarefied and condensed air.

How are you to utilize both the compressed and rarefied air in the treatment of diseases of the lungs?

The two parts of respiration are not made in the same air. The patient is required to make inspiration in compressed air and expiration in rarefied air, and if, in the apparatus of Waldenberg, this manœuvre is difficult, it is quite easy in those of Schnitzler, more or less modified, and in that of Dupont. In the former it is by a play of valves that the patient alternately makes expiration in rarefied, and inspiration in compressed, air.

In the case of Dupont's instrument, it is by moving the lever, now to the right, now to the left, that the patient obtains this result.

It is chiefly in pulmonary emphysema and in the broncho-pulmonary catarrhs that we obtain good effects from this kind of treatment. These inspirations in compressed air,

followed by expirations into rarefied air, constitute a veritable "air-washing" of the lungs, which expels the air stagnating in the distended pulmonary alveoli, and enables them to regain their primitive elasticity. This air-washing also facilitates the clearing of the bronchi, and the expulsion of the mucosities which obstruct them more or less completely. If you add to this lavage an air charged with balsamic principles, you readily see how you can thus treat advantageously the catarrhs of the chest.

Moreover, in cases of narrowness of the thorax and predisposition to tuberculosis, the employment of this method constitutes a kind of pulmonary gymnastics which can but have beneficial results. But, taken as a whole, these apparatuses have been found inferior in practice to the pneumatic chambers; they have not that action on nutrition which the baths of compressed air possess, and which constitutes one of the most useful effects of this sort of medication.

Notwithstanding the benefits which have been derived both from the pneumatic chambers and from the portable apparatuses, results based on sound data of physiology, aerotherapy has not come into very general use, and this is on account of the following reasons: first, there are few persons who can spare two hours out of each day for the treatment of their pulmonary affection, and then the expense attending these compressed-air baths is considerable. As for the portable apparatuses, they are rarely employed in private houses, and it is only exceptionally that they are now used at all. This is, in my opinion, a lamentable neglect, and I believe that we should do well to take more interest in the employ of aerotherapy, and in particular of baths of compressed air; and I trust that this lecture will have the result of calling anew the attention of the profession to a kind of medication attended with little danger, and which in a great number of cases has very useful effects.

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## *DRUG INTERFERENCE.**

By Thos. J. Mays, M.D.†

THE belief that "there is a remedy for every wrong" is as natural in a medical as it is in a moral sense. The savage, through an accumulated experience, has learned that by taking counteracting poisons he protects himself against the bites and stings of venomous animals; sub-lethal doses of rattlesnake venom, as has recently been shown by Dr. Sewall, have a prophylactic influence against fatal doses of the same poison; and Dr. Cash has likewise demonstrated that the administration of corrosive sublimate in divided and highly-diluted doses will secure immunity from otherwise fatal quantities of anthrax poison. On the other hand, it is also well established that between muscarine and atropine, between muscarine and pilocarpine, and between physostigmine and atropine, there exists a genuine antagonistic action.

In the February number of the Therapeutic Gazette for the year 1885, and in No. 6 of the *Centralblatt für die Medizinischen Wissenschaften* for the same year, I published some experimental observations on drug antagonism, in which I showed that, so far as the frog's heart was concerned, a marked antagonism existed between many of our most important remedial agents; and the remarks in this paper will be chiefly based on the work there recorded. The apparatus which I employed was virtually the same as that described before the college in my essay on the "Nutritive Value of some Beef Extracts" (see *Transactions of College of Physicians*, 1886, vol. viii. p. 264; also Therapeutic Gazette, March, 1886).

In judging this work, it must be borne in mind (1) that the frog's heart will continue to beat so long as it is supplied with nutritive material like blood, which was used in these experiments, or until it is overpowered or paralyzed by some poisonous agent; (2) that the highest amplitude of the heart's pulsations while thus fed is a measure of its capacity for work; hence the pulse-tracings obtained under such conditions are taken as a standard, with which all other tracings are compared; and (3) that it is not intended that the heart should here serve as a circulatory organ, but merely as an organic medium, with which the action of therapeutic agents can be demonstrated. Now, it developed that on the addition of a small quantity of any drug to the blood the heart's contractions became fuller than those which were derived from blood alone; while, on the contrary, larger quantities diminished the same in proportion to the amount which was administered. This is well shown in the following tracing, which was obtained from alcohol:

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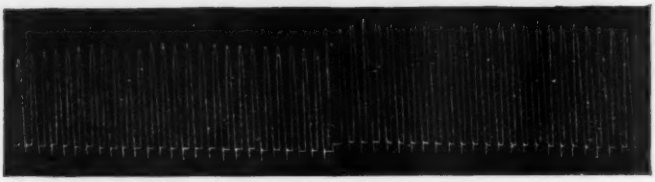
* Read before the Philadelphia College of Physicians, April 4, 1888.

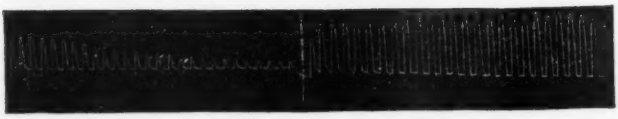
† Professor of Diseases of the Chest in the Philadelphia Polyclinic.



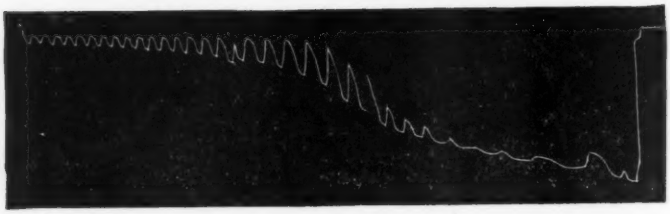
2 p. c. Blood sol. Alcohol 1 : 2000.

1 : 666. 1 : 1000.

1 : 400. 1 : 1000.



1 : 25. 1 : 1000.



1 : 5.

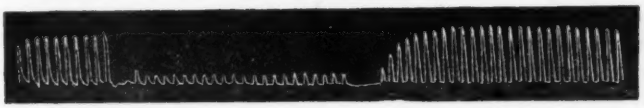
The first part of the tracing is given by a two per cent. blood solution alone, the second by 2000 parts of the same blood to 1 of alcohol, the third by 666 parts of blood to 1 of alcohol, and so on, until finally it was found that 1 part of alcohol to 5 parts of blood completely paralyzed the heart and arrested it in diastole.

It further appeared that those agents which showed an affinity for the heart's muscular irritability arrested it in diastole, and those which affected its nervous irritability arrested it in systole. Among the former are alcohol, ether, nitrous and chloric ether, chloroform, acetic and carbolic acids, aconitine, aloin, atropine, brucine, cannabin tannate, cocaine, curare, gelsemine, kairin, lycopine, quinine, resorcin, strychnine, veratrine, and all the potassium salts. Among the latter are caffeine, chloral hydrate, delphinine, digitaline, morphine, salicine, saponine, theine, and all the sodium and ammonium salts.

Every agent here named behaved in a way precisely similar to that of alcohol. Each one possessed a dose which gave higher heart-beats than could be obtained from blood alone, as well as a dose which entirely inhibited the heart's action. The former was called the minimum and the latter the maximum dose.

Now, when the minimum and maximum doses of some of these agents are once worked out, it appears that the minimum doses are direct antagonists to maximum doses. This is especially true of those agents which have an affinity for the heart's muscular irritability, and which arrest the heart in diastole. For example, a maximum dose of chloroform of 1 part to 500 of blood solution will almost entirely inhibit the heart's action, but when a minimum dose of atropine or of

curare be added to this dose and administered the cardiac pulsations will probably be nearly as high as they would be under the influence of minimum doses of either of these agents or of the two per cent. blood solution. This is well shown in the following tracings obtained from atropine and chloroform :



Atropine. 1 : 160,000. Chloroform. 1 : 500. Their combined effect.

The first part of the tracing was given by atropine and blood solution in the proportion of 1 : 160,000 ; the second part by chloroform and blood solution in the proportion of 1 : 500 ; and the third part by their combined effect.

The following tabular arrangement shows the pulse elevations in millimetres of the drugs which were found to possess these antagonistic properties :

| | Names of drugs and their dilutions. | Pulse elevations in millimetres. |
|---|---|---|
| I. | Atropine.....1 : 160,000 | 13 |
| | Alcohol.....1 : 25 | 4 |
| | Their combined action..... | 8 |
| II. | Aconitine.....1 : 160,000 | 15 |
| | Ether.....1 : 5 | 5 |
| | Their combined action..... | 10 |
| III. | Curare.....1 : 80,000 | 18 |
| | Ether.....1 : 10 | 10 |
| | Their combined action..... | 18 |
| IV. | Atropine.....1 : 160,000 | 10 |
| | Ether.....1 : 10 | 7 |
| | Their combined action..... | 10 |
| V. | Atropine.....1 : 160,000 | 8 |
| | Chloroform.....1 : 500 | 2 |
| | Their combined action..... | 9 |
| VI. | Curare.....1 : 80,000 | 12 |
| | Chloroform.....1 : 500 | 3 |
| | Their combined action..... | 9 |
| VII. | Aconitine.....1 : 160,000 | 16 |
| | Chloroform.....1 : 500 | 4 |
| | Their combined action..... | 15 |
| VIII. | Ether.....1 : 400 | 7 |
| | Chloroform.....1 : 500 | 3 |
| | Their combined action..... | 7 |
| IX. | Strychnine.....1 : 160,000 | 14 |
| | Chloroform.....1 : 500 | 9 |
| | Their combined action..... | 15 |
| X. | Veratrine.....1 : 160,000 | 14 |
| | Chloroform.....1 : 800 | 13 |
| | Their combined action..... | 16 |
| XI. | Aconitine.....1 : 160,000 | 16 |
| | Curare.....1 : 26 | 5 |
| | Their combined action..... | 15 |
| XII. | Atropine.....1 : 160,000 | 14 |
| | Curare.....1 : 50 | 10 |
| | Their combined action..... | 14 |
| XIII. | Atropine.....1 : 160,000 | 15 |
| | Strychnine.....1 : 1000 | 4 |
| | Their combined action..... | 14 |
| XIV. | Strychnine.....1 : 160,000 | 17 |
| | Atropine.....1 : 1000 | 4 |
| | Their combined action..... | 15 |

It is very evident that in all these instances there are at work two forces which are antagonistic in their action on organic tissue, the one tending to enhance its function and the other to interfere with it. These effects are displayed here as decidedly by drug interference as if they had been wrought by the two mechanical forces of attraction and repulsion, and they give us an exact mathematical demonstration that drugs have the power of supporting and preserving life when attacked by adverse forces. And if we recognize the fact that disease is but the manifestation of forces which move in a direction inimical to health, and if we substitute these for the operation of the maximum drug doses in the above illustrations, do we not have a clear picture before us as to how drugs combat disease,—viz., by interference ? The fact of force interference is well established in the physical world. Two antagonistic sound-waves produce silence, two opposite undulations of light produce darkness, and who will say that a similar relation may not exist between drug and disease force ? Who will say that a similar adjustment cannot be formed between most of our diseases and many of our varied and powerful therapeutic agents ?

Associated with this power of interference, most, if not all, of our drugs possess the property of selecting and acting on special tissues without disturbing the surrounding structures. Hence we are justified in drawing the inference that given the knowledge of a drug, and of the tissues for which it has

a special affinity, we can so regulate the dose of the former that it will enhance the vitality of, and may in this manner eradicate disease existing in, the latter.

The matter of dosage is a point which requires attention. It is probably more important to select the proper dose than the proper agent, if our aim is to secure the greatest possible amount of stimulation without engendering any toxic properties, for it was invariably shown in these experiments that minimum and not maximum doses had the power only of exalting vital action. This is demonstrated in all, and especially in the examples where atropine in minimum doses was the antagonist to maximum doses of strychnine, and conversely minimum doses of strychnine became the antagonist to maximum doses of atropine.

This power of special action is clearly defined in the following well-known examples of clinical therapeutics. On account of a special affinity for the peripheral nerve-endings, atropine, in small doses, checks sweating and ptyalism, regulates the action of the heart, dilates the iris, and, by increasing intestinal peristalsis, it relieves constipation. Cantharides, owing to its affinity for the urinary tract, stimulates excretion of the kidneys, alleviates urethral irritation, and gives tone to the muscles of the bladder. Castor oil and aloes, on account of their elective action on the alimentary canal, the former on the upper and the latter on the lower part, are favorably known as agents for checking infantile diarrhœa when given in small doses. Pilocarpine, by acting on the sweat-centres, stimulates the cutaneous, salivary, bronchial, and lacteal secretions, and thus becomes a valuable remedy in many of the diseases which affect those structures.

Now, when these examples of definite therapeutic action are considered in connection with the experimental data which form the basis of this paper, I think they give us ground for hoping that those diseases, which are believed to be due to the action of poisons known as ptomaines and leucomaines, will find their fitting antagonists in the still undiscovered properties of our therapeutic agents. These toxic agents are analogous to our vegetable alkaloids both in chemical composition and in their behavior towards animal tissues. Professor Brieger extracted neurine, ethelendiamine, and muscarine from decomposing fish flesh, the latter of which is also obtained from the mushroom, *Agaricus muscarius*. In mammals, muscarine slows the pulse, lowers the blood-pressure, inhibits salivary and lachrymal secretion, increases pancreatic, hepatic, mucous, and cutaneous secretion, contracts the pupil, and produces powerful tetanic contractions of the stomach and intestines, as well as vomiting and diarrhœa. These muscarine phenomena, which are completely antagonized by atropine, as has been shown by Professor Schmiedeberg, give us in the main a typical outline of the familiar symptoms of gastro-intestinal catarrh in children, which are usually regarded as coming on without specific cause other than that of faulty diet and digestion. Professor Brieger also isolated several other animal alkaloids, one of which gives rise to severe intestinal peristalsis and diarrhœa, and the other, which he calls mydaleïn, is still more remarkable because it produces a marked rise in the bodily temperature. In guinea-pigs it increases the salivary, nasal, and lachrymal secretions, dilates the pupil, and the rectal temperature is increased from 1° to 2° C. At the same time there is marked increase in the peristaltic action of the intestines, great dyspnœa, paralysis, and gradual death. Typhotoxine, another ptomaine produced by the Koch-Eberth typhoid bacillus, causes salivation, paralysis, and exhaustive diarrhœa in animals (Wolff); tyrotoxicon, isolated from decaying cheese by Professor Vaughn, and believed by him to be the specific cause of cholera infantum; peptotoxine, formed during the digestion of fibrin by artificial gastric juice, and sepsine, a crystalline substance yielded by decomposing yeast, both very poisonous; the atropine-like poison found in putrefying meat solution, and which probably produces the well-known symptoms of sausage-poisoning; the powerful poisons which have been extracted from the fæces and urine, and which may be responsible for many of the so-called digestive disorders, as well as for the little-understood disease known as uræmia; and the tetanus ferment, which has recently been shown by Dr. Shakespeare to possess the power of inducing tetanus in animals, all demonstrate the possibility that many of our most common diseases may depend on causes which are specific and alkaloidal in character, and which will some day be shown to have their true therapeutic antagonists.

With a view of widening the field of therapeutic knowledge, it may be asked what clew the considerations offered in this paper give us in reference to the discovery of new drug properties and their practical application to the process of disease? In answer, it may be

stated that the first step which they indicate to be taken in this direction consists in ascertaining the tissue, structure, or cell for which any given drug or disease shows an elective action, and then to find the proper quantity of the drug which will prove antagonistic to the disease. The solution of this problem is, however, not so simple as it appears from the premises. For if we regard disease as the resultant of forces moving in a direction contrary to health, then we must also accept the alternative propositions that the forces which inaugurate disease consist of many varieties and shades, and that, in order to deflect these, a similar diversity of therapeutic resources are required. Hence he who studies every case in detail from an independent stand-point, and who gives due consideration to every influence which we know is capable of moulding the processes of life, is a better practitioner than he who to-day mechanically prescribes that which benefited a similar case yesterday.

Let our experience be to us a general guide in the application of remedies, but let us also recognize the fact that the nature of the food, its metabolism and that of the tissues, occupation, climate, inheritance, diathesis, temperament, education, the moral, social, and religious state, the action and interaction of all the bodily organs, constitute a powerful set of forces, which vary in each and every individual, and which must not be left out of calculation if we wish to avoid the disappointments and pitfalls which are incidental to slipshod prescribing.

1829 Spruce Street.

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## *COCA AT HOME AND ABROAD.*

By H. H. Rusby, M.D., New York.

(Continued from page 165.)

### II.—COCA ABROAD.

By the term coca abroad I refer to exported coca-leaves, the distinctive difference between which and the native leaves is one caused by the passage of time merely, and not by any change of conditions incurred in the process of exportation. The term, therefore, would include, for the purpose of this paper, leaves in their own country when kept for several weeks after collection and drying. The chemistry of such leaves has now been very thoroughly worked out, the substance of our knowledge on the subject being very well covered (with a single exception) in a little work by Professor Novy.* I consider here only the points necessary to explain, compare, and apply the results of the few simple observations made by me concerning the composition of the native leaves, and detailed at the close of my last paper.

The alkaloids of exported coca-leaves are several, a number of them forming a series representing successive steps in the destructive metamorphosis of cocaine. The evidence of this fact is twofold: first, the cocaine may be artificially broken down successively into those alkaloids; second, one of those alkaloids (benzoyl ecgonine) may be artificially builded up into cocaine.

The series is as follows:

I. Cocaine.
II. Cocaicine or cocainoidine.
III. Benzoyl-ecgonine.
IV. Ecgonine.

The process of decomposition may also include other states. Besides this series there is another base quite independent of cocaine. It is the volatile alkaloid hygrine, which exists as a brownish, syrupy liquid. The infinitesimal amount of this alkaloid to be obtained long rendered its examination impossible and its existence doubted or denied by all but one or two chemists, chief of whom was Professor Ralph Stockman, of Edinburgh, who stood almost alone in asserting it to be a distinct alkaloid. His recent reports are discussed further on.

To institute the comparison sought, I notice the behavior of these alkaloids in two particulars only,—first, as to their solubility in certain menstrua; second, as to their reactions with Mayer's reagent.

Cocaine and cocaicine are both soluble in ether and alcohol; ecgonine, benzoyl-ecgonine, and hygrine readily dissolve in water or alcohol. Hence, supposing them all to exist in a given sample of coca-leaves, they would be extracted by Prollius's fluid,—a mixture of ether, alcohol, and aqua ammonia. Extracting thus two and a half grammes of exported coca-leaves, agitating the extract with two grammes of acidulated water and evaporating the extracting fluid, there results two drachms of an acid aqueous solution of

* "Cocaine and its Derivatives." By Fredk. G. Novy, M.D., Assistant in Organic Chemistry, University of Michigan. Detroit: George S. Davis.

such of these five alkaloids as were present in the leaves.

We set this solution on one side, and proceed to extract from another exactly similar solution the cocaine and cocaicine separately. This may be done by rendering the solution slightly alkaline, and agitating it with ether, which can then be decanted and evaporated from two drachms of acidulated water, which we add. We now have two drachms each of two solutions, which differ only in that one contains the total alkaloidal constituents of two and a half grammes of leaves, while the other contains only the cocaine and cocaicine from an equal amount of leaves. Triturating each in turn with Mayer's reagent until no more precipitate is formed, we find the relative amounts of reagent required for the two solutions bear about the ratio $\frac{1}{16}$. It will be remembered that in the case of the native leaves the same comparison returned a ratio of about $\frac{5}{16}$, showing a vast difference in the active constituents of the two drugs.

A pound of ordinary leaves contains about fifty grains of cocaine, although only about half that quantity can be crystallized in manufacturing. So that a drachm of the fluid extract of coca made from good leaves should contain about three-eighths of a grain of cocaine. Practically, however, it is as impossible to say how much cocaine one is prescribing in a dose of the fluid extract of coca as it is in regard to the active constituent of any other fluid extract. There may be fifty to one hundred per cent. more of the active constituent in one lot of fluid extract than in the lot next made, the crude drug in both cases passing in the market as "good," a fact which should teach us the importance of assayed preparations.

The physiological and therapeutic action of exported coca is that of cocaine, for it contains no other active constituent in sufficient quantity to materially modify its effects. The physiological action of cocaine is not very well known, notwithstanding the multiplicity of contributions, some of them very elaborate, which have been presented upon the subject. There is hardly one of the physiological effects of this drug on which we have not exactly contradictory reports. Making all allowance for the complexity of the subject, it is quite evident that a large part of this confusion has been caused by a want of thoroughness, or a too great haste in deducing conclusions on the part of those who have experimented with the drug. It is quite easy to present a *résumé* of these contradictory reports, but very difficult, indeed, to construct from them a consistent scheme. Nevertheless, scrutinizing carefully all the reports on cocaine that have appeared in the English language since 1884, we are enabled to draw certain conclusions with tolerable safety.

The effect of cocaine upon the intellectual faculties is the best marked of its physiological actions, and is distinct from that of any other drug. Imagination as a factor in this result is excluded by the fact that it can be produced with equal certainty in man or in the lower animals. These symptoms vary directly with the dose. A moderate dose of cocaine produces only exhilaration. It is a species of intoxication somewhat resembling that of alcohol, and coming as near to a state of happiness as can be expected to result from the administration of any drug. This state has been very greatly exaggerated by some writers, but it has been well described in a number of papers, and we only refer to it in this abstract. The period of excitement glides into a condition of quiet contentment, which has been very perfectly described as a "state of well-being." If a larger dose has been administered, this state of exhilaration becomes a state of more or less painful excitement and mental strain, passing into feebleness. The state of cerebral excitement reminds us strongly of oxygen intoxication, and it is, furthermore, accompanied by an elevated temperature. In many persons the capacity for mental work is greatly increased.

Cocaine has no direct effect upon either striped or unstriped muscular fibre.

Upon the sympathetic nerve-centres its tendency is directly towards depression or paralysis, according to the relative dose. This tendency is combated with the result: (1) of a reactionary stimulus only; (2) of a reactionary stimulus succeeded by depression; or (3) of a primary depression or paralysis, according to the dose, and the character and condition of the subject. After the period of depression, if it be not too severe, there is a second period of reactionary stimulation. The evidences of this action are—a great contraction of the vessels, followed by an even greater dilatation, and, again, of contraction (these symptoms not agreeing in all classes of subjects). The stage of dilatation is accompanied by, and apparently causes, an increase of temperature.

Of the effect on the sensory system it is impossible to judge, equally high authorities stating that it produces general anæsthesia and general hyperæsthesia. It is probable,

as claimed by some, that it blunts the power of perceiving sensations, while it leaves unaffected or even increases the power of receiving and conducting them. The unequal existence of this effect results in inco-ordination. But it is certain that if it can penetrate to the fibres of a nerve-trunk it cuts off communication with the peripheral portion. It is equally certain that spinal reflexes are heightened until their capacity has become exhausted.

Like the sympathetic, the motor system is depressed or paralyzed, according to the conditions of dose and subject. Here also the depression may be preceded by a period of stimulation, which may be greatly prolonged, and which does not exactly coincide in the case of the cranial and other nerves. As a result, the pupil is dilated, the respiration, perhaps after a brief period of excitement, is depressed, with exactly the peculiar symptoms which we observe in case of section of the pneumogastric. The heart's action is increased, and, through the primary vascular contraction, a state of increased blood-pressure is brought on. If the influence continue, this gives way to a state of collapse. The effects upon the respiration are always earlier and more profound than those upon the heart.

In the stomach, digestion is promptly checked.

Intestinal peristalsis is briefly increased, then lessened or stopped.

Of these nervous effects all can be modified and controlled to a most remarkable degree by adaptation of the amount and method of administration of the dose.

Nearly all that is known on this point is the result of accident, as no systematized experiments have been performed with a view to establishing a law. Yet it is by far the most important part of the investigation. If it be possible, as it certainly seems to be, to so arrange and administer a series of doses as to secure and maintain a single effect, or set of effects, of the drug, we at once utilize highly-valuable properties. But all this is yet to be discovered. Our knowledge of the therapy of cocaine is almost limited to its use as a palliative in emergencies. Of the remote effect upon the several systems of its continued administration very little is known. It is recorded that its action is not cumulative. We know that digestion is permanently impaired by its long-continued use, and that chronic constipation must be guarded against. This would lead us to suppose that it would prove of service in chronic diarrhœa and chronic catarrhal troubles.

Excellent results have been obtained by the use of cocaine in functional mental derangement, and its possibilities in this direction seem very great. By judicious care the dose may be so apportioned as to secure the calming and cheering effect of the drug without any subsequent reaction. But the very nature of such an action sounds its own warning. Its field of special usefulness is its field of special danger, and its administration in such cases especially should always be confided absolutely to a careful and experienced physician.

Bearing strictly in mind the object of these papers as a comparison of the properties of the native and exported leaves, I have summarized as briefly as possible our positive and theoretical knowledge of the latter, and now note the following points of agreement and discrepancy.

The chemical tests heretofore noticed show unquestionably the presence in the native leaves of some compound or compounds, which begin at once and rapidly to disappear after the leaves are dried. But fortunately we are no longer dependent upon those indicative results. Professor Ira Remsen, of the Johns Hopkins University, most kindly consented to assist me in the examination of some of the preparations which I brought from Bolivia, and the report of his assistant, Mr. F. Langfeld, is given below.* The bitter

* An examination of the extracts obtained by treating dried coca-leaves (recently-dried leaves,—H. H. R.) with acidulated and non-acidulated alcohol, strong and dilute, and with water, pure, acidulated, and rendered alkaline, shows that dried coca-leaves contain a compound that precipitates Mayer's reagent, and is not taken up from alkaline solutions by ether. It is not an alkaloid, precipitates neither mercuric nor platinic chloride, and is very soluble in water and alcohol. It may be obtained in an impure state by treating the leaves with water and sodium carbonate (1 to 100), precipitating coloring-matter with lead acetate and excess of lead as sulphide or sulphate, evaporating carefully on the water-bath, extracting with alcohol and evaporating.

It may also be obtained from any of the other extracts by rendering alkaline, removing cocaine by means of ether, and proceeding as above.

On examining similar extracts made from fresh coca-leaves, it was found that sodium carbonate and water (1 to 100) extract from them nothing that precipitates Mayer's reagent. If the extract obtained by using acidulated alcohol or water be rendered alkaline, and the cocaine extracted with ether, the residue will contain a trace of the above-mentioned compound.

This is present, however, in very much smaller quantity than in the extracts of the dried leaves, and it seems reasonable to suppose that it is a decomposition product

principle to which he refers may or may not be a decomposition product of cocaine. This is too much to assume. But in any case its physiological properties are not known, and it is a compound whose effects the coca-chewer must get, but which are absent from preparations of the exported leaves. The second compound, which Mr. Langfeld takes to be an oil, must probably be considered, in the light of recent information, as the volatile alkaloid hygrine. This alkaloid has not heretofore been known, simply because of the minute amounts in which it can be obtained from exported leaves. So small is the quantity that it "is only to be got on the large manufacturing scale. Even here, however, the yield is small, and it is not obtained at all by some makers of cocaine." Professor Stockman, in the face of persistent incredulity, has insisted on its definite and independent nature, but was unable to prove his assertion until I sent him a fluid preparation made from the native leaves. Of this he says, "It was brownish-green in color, with an aromatic, pleasant taste, and had a strongly-stimulant effect. I evaporated it to the consistence of a thick syrup, digested this with slaked lime, and then extracted with ether. On evaporating the ether there remained a brown, rather thick substance, which had a burning, bitter taste, a penetrating odor, and a strong alkaline reaction. It slightly numbed the tongue, and was evidently a mixture of hygrine and cocaine." He then goes on to speak of the impossibility of finding a method for completely separating it from the cocaine. He obtained it from the preparation "in relatively large amount."* It is to be noted that if, as was evidently the case, he used heat during any part of the evaporation process, he lost the most of his hygrine, in accordance with my experience in Bolivia. The formula $C_{12}H_{13}N$ has been assigned to this alkaloid, and its identity can no longer be questioned. It is highly volatile, and is unquestionably very largely the substance indicated in my tests. Of its physiological action very little is yet known, but the few experiments made with it show that it exerts a powerful influence on the system. The impossibility of separating it entirely from cocaine renders the proper appreciation of its effects the more difficult. Its own effects are apparently opposed to those of cocaine, for, in my own case, I found that even in its impure state it, like native coca-leaves, immediately and powerfully slowed both the pulse and respiration. An American, visiting La Paz, took a large dose of the impure product, and passed the night in making pilgrimages.

I have already clearly shown in my first paper that the value of coca-leaves for native consumption corresponds closely with the amount contained in them of these little-known compounds. It now remains to discuss which of the native effects of coca correspond with our present knowledge of the properties of cocaine.

The mental effects seem to agree perfectly in both cases, and are doubtless chiefly due to the effects of the cocaine. As to the deleterious mental effects of its continued use, they have been very greatly exaggerated. Most of our cocaine victims have certainly first been morphine or alcohol inebriates, and have exchanged a generally-detested vice, which they realized must soon become public, for a new and fashionable one, which would bring them only pity. Still, as before stated, the nature of the drug points to such a danger as an unfortunate reality. The reasons that such effects are so much more common here than among coca-chewers are two. In the first place, it is nerve stimulus as applied to *intellectual* and *emotional* activity, which is ruinous; hence the lethargic Indian is less easily affected than our own highly-cultured people. Second, as I shall show later, I believe that many of the evil tenden-

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of cocaine, as there is no doubt that some of the alkaloid is decomposed on drying the leaves. On treating both dried and fresh leaves with calcic hydrate and water, precipitating the lime, the liquid precipitates Mayer's reagent. If it is treated with ether, this takes up a substance which is not given up by it to acidulated water, and is left, on evaporation of the ether, as a dark yellow oil, precipitating Mayer's reagent. The fresh leaves give a larger yield of this oil than the dried leaves do, but this is easily accounted for, as they contain more cocaine, and the oil is a decomposition product of cocaine, as none of that alkaloid is contained in the extract.

As the bitter principle mentioned above is probably contained in all dried coca-leaves, and the oil may be present in badly-cured leaves, these two compounds are probably responsible for the difficulty heretofore encountered in the assay of coca-leaves, and I venture to suggest that this be done by macerating or percolating the leaves with acidulated water, making alkaline, extracting cocaine with ether, and from this the cocaine with acidulated water.

It may then be determined by making the solution alkaline, extracting with ether, evaporating and weighing, or by Mayer's reagent.

I find that cocaine is completely taken up from alkaline solutions by ether, which in turn gives up the alkaloid just as completely to acidulated water.

* *Pharm. Journ. and Trans.*, February 25, p. 701.

cies of cocaine are directly prevented by its association in the native state.

In the power to overcome nervous exhaustion there is a similarity in the two drugs, but the action of the native drug is not evanescent, as in the case of cocaine, and there is not the danger of an unfavorable reaction.

The effect upon the appetite is the same in both cases. It is at once abolished by a sufficient dose of cocaine, whether taken in the form of chewed leaves, native elixir, or a pure solution. Hence coca is never taken just previous to a meal. But upon digestion the effect of preparations made here is entirely at variance with that of the native leaves. The action of cocaine is to immediately check the digestive process, the effect being persistent,—often very persistent,—and the results of continued use pernicious. Not so with the native drug. Every writer who has ever touched upon this subject has referred to it as a digestive tonic, the effects of which can, of course, be perverted by abuse. I have elsewhere related how the citizens of La Paz resort to the native preparation to assist digestion after too heavy eating. The strength of such a preparation is two ounces to the pint, so that about ¼ grain of cocaine is taken at a dose, a quantity too small to produce any perceptible effect, and the action of which is entirely lost in face of the other highly-stimulating principles, which are contained in much larger amount.

In the case of the intestinal function the comparison is quite as striking. The action of cocaine is constipating, and constitutes a serious evil in cases of prolonged administration. When the fluid extract is exhibited, the evil is increased by the tannin contained. But the action of native coca, on the contrary, is stimulating to intestinal activity, and its permanent effect is laxative.

The poisonous-intoxicating effects of cocaine are no longer denied, and every practitioner has known of fatal cases. Yet at home, where, in cases of emergency, enormous amounts of the drug, representing eight or ten grains or more of cocaine, are swallowed within a very short time, such an effect is unknown, and the Indian smiles incredulously when told that coca-leaves contain a poison.

We see it expressly stated that cocaine is synergistic of arsenic, but I have already stated that the native leaves are used as an antidote to that form of poisoning.

Both forms of the drug agree perfectly in their power to abolish painful sensations, particularly those due to hunger and thirst. Whatever may be the mechanism by which this effect is produced, it is unquestionably due to the action of the cocaine. Here we find an important explanation that coca lessens waste during exertion, and decreases the exhaustion of ill-fed laborers and travellers. It is done through the sensory system alone. Beyond this cocaine has no supporting or nourishing power whatever, the reverse, indeed, being true. The essential action of cocaine is an enfeebling one. The slight muscular stimulating effect which can (not always) be obtained is quite ephemeral. Every attempt which has been made, and they have been many, to support athletic competitors, has resulted in failure, or even in disaster. One exception has been recorded, and here a "wine of coca," which probably represented alcohol only, produced the beneficial effect. Moreover, careful starvation experiments have been instituted, by which it was ascertained that exported coca furnished no aid to nutrition. But it is a matter of history that the starving inhabitants of La Paz were sustained by their native coca-leaves. No further reference than we have already made is necessary to show the notorious power of native coca to support exertion.*

To conclude, it is evident that the historical drug coca is practically unknown to the medical profession, and must remain so so long as they depend upon the exported leaves. Preparations to contain the full property of the leaf must be made immediately after they are gathered and dried. As previously shown in my tables, the use of the green leaves presents no advantages over those from the carefully-dried leaves, provided they are used at once. Unfortunately, our absurd system of taxation must deprive the poorer classes of the use of such preparations, and the difficulty of extracting in a pure state the active constituents will prevent the exercise of economy in that direction.

COLUMBIA COLLEGE, NEW YORK.

* The comparative effects of alcohol and coca were curiously illustrated in a remark of one of the natives. The wild Indians having captured and carried off three Christian women, we succeeded in capturing two of their number and forcing them to lead us to the hiding-place of their companions. One day, previous to starting on our expedition, we administered whiskey to these two Indians to note the effect, for it seems that strong alcoholic beverages are unknown to that tribe. Afterwards we questioned one of them as to its effects as compared with those of coca. He replied, "Coca helps a man to live, but this (whiskey) puts strength into his arms for rowing."

## *ON THE CHEMICAL CONSTITUENTS OF CHEKEN-LEAVES (MYRTUS CHEKEN, SPRENG).*

By F. Weiss, M.D., Leipsic, Germany.

ALTHOUGH the cheken-leaves were introduced to the American market as early as 1863, and greatly commended of late as a medicament, there have hitherto been lacking thorough investigations respecting their chemical constituents. The investigations heretofore made* were limited to the determination of an ethereal oil, to the establishment of several general chemical reactions, and to the analysis of the constituents of the ash.

At the suggestion of Prof. R. Boehm I undertook, in the Pharmacological Institute at Leipsic, a more accurate chemical investigation of the cheken-leaves, the results of which are stated in the following:

Messrs. Parke, Davis & Co., Detroit, Mich., were so kind as to place the material for my researches at the command of the Pharmacological Institute at Leipsic.

The most important constituent of cheken-leaves is undoubtedly the ethereal oil.

Messrs. Schimmel & Co., manufacturers of ethereal oils at Leipsic, had the kindness to execute the distillation of the oil from fifty kilogrammes of cheken at their command, and I thus received five hundred and sixty grammes of the ethereal oil. This quantity corresponds to a proportion of one per cent. ethereal oil in the dry cheken-leaves.

The ethereal oil is of bright greenish-yellow color, of pleasant odor, recalling that of eucalyptus and salvia, of neutral reaction, and on slow evaporation in the air leaves behind five per cent. of a resinous mass. When subjected to the cold, neither congealing nor deposition of crystals results. The specific gravity of the oil, dehydrated by chloride of calcium, is at +15°C. 0.8975. It is miscible with absolute alcohol, ether, chloroform, etc., in all proportions, but dissolves only in from 18 to 20 parts of alcohol of 90°. The rotary polarization is $(\alpha j) = +23.5$. Iodine is dissolved without reaction; bromine in chloroform solution (1 to 20) is at once decolored. Concentrated sulphuric acid, as well as chromic acid, dissolved in alcohol, produced a yellowish-brown coloration. Picric acid is dissolved without coloration by the ethereal oil on warming. The action of fuming nitric acid is accompanied by explosion. On mixing with acetic anhydride, concentrated nitric acid, and chloroform, a deep blue color results.

In my further investigation of the ethereal oil I governed myself by the valuable labors of Wallach, which have recently appeared in the *Annalen der Chemie und Pharmacie.*

By fractional distillation I was able to obtain from the oil three parts,—one free from oxygen and two portions containing oxygen.

The first or chief constituent (seventy-five per cent. of the oil) is a colorless, strongly fluorescent, hydrocarbon, $C_{10}H_{16}$; of agreeable odor; specific gravity at +15°C. 0.8635; boiling-point, 156° C. (not corrected); rotary polarization, $(\alpha j) = +31.28$.

Under the action of bromine a brown, uncrystallizable mass results. When subjected to the action of dry hydrochloric acid gas at a very low temperature the hydrocarbon is converted into camphor-like crystals of the formula $C_{10}H_{16}HCl$. On heating in a tube, hermetically sealed, at 260° to 270° C., dipentene is formed; boiling-point, 173° to 174° C.; optically inactive. It furnished, on the addition of bromine, colorless crystals of dipentenetetrabromide, $C_{10}H_{16}Br_4$; melting-point, 125° to 126° C.

From the foregoing it follows that the portion free from oxygen, and distilled at 156°, is identical with the penin of Wallach.

The second portion of the cheken oil, about fifteen per cent., contains oxygen; boils at 170° C.; is optically inactive. On the addition of bromine there resulted the characteristic beautiful brick-red crystals of cineoldibromide (Wallach). The second portion is accordingly cineol, $C_{10}H_{18}O$.

The third portion (about ten per cent.) was apparently a mixture of substances containing oxygen and boiling at a temperature beyond 220° C. It yields a yellow, dense oil, smelling strongly of cheken, from which characteristic constituents do not permit of isolation.

In an aqueous extract of the residue of the leaves remaining after distillation of the ethereal oil, tannin in large proportion could alone in the main be shown.

The leaves, freed from the ethereal oil, were, therefore, extracted with hot alcohol. The alcoholic tincture, on cooling, deposits a colorless, wax-like substance, which is removed by filtration. After standing for several days, there separate from the alcoholic liquid beautiful crystal crusts, of a body which may be secured in pure condition, by repeated recrystallization, first from glacial

* Hutchinson, *Pharm. Journ. and Transact.*, 1879, 653, 666; J. W. England, *Amer. Pharm. Journ.*, 1883, 246; Hoehn, Therapeutic Gazette, 1882, 284; *Pharm. Journ. and Transact.*, 1883, 798.

acetic acid, then from hot alcohol. This substance I call *chekenon.*

The mother-liquid, separated by filtration from the crystals, is now concentrated to the density of an extract, and boiled with water, whereupon a green, resinous mass is deposited on the bottom of the vessel. This mass (A) and the aqueous filtrate (B) were manipulated further after separation.

The resinous deposit (A) was dissolved in a little alcohol, well mixed with a sufficient quantity of calcined magnesia, and the whole then poured into a considerable quantity of water and filtered. From the dark yellow filtrate there is deposited, on the addition of dilute sulphuric acid, an abundant flaky, yellow precipitate, which consists of an amorphous, bitter principle (cheken bitter) and of a beautiful crystallizing substance, which I call *cheken acid.* Both these bodies may be separated by fractional crystallization.

There remains on the filter (on filtering off the liquid containing the cheken bitter and the cheken acid) an excess of magnesia and the magnesia combination with a green resin, which, after acidulating with sulphuric acid, can be shaken out with ether, but which was not investigated.

In the aqueous filtrate (B) there are tannin, sugar, and inorganic salts. By precipitation with acetate of lead there results a voluminous yellow precipitate. The latter was washed with considerable water, and finally with alcohol, then diluted in water, and decomposed by sulphuretted hydrogen. The filtrate—sulphate of lead—deposits on evaporation on the water-bath small quantities of a yellow-colored substance, which crystallizes well from glacial acetic acid. I designate this *chekenetin.*

In the filtrate, consisting of the precipitate of acetate of lead, there were shown, after removal of the lead by sulphuretted hydrogen, besides a good deal of sugar and inorganic salts, small quantities of cholin, which gave former investigators occasion for supposing the presence of an alkaloid. Aside from the cholin, I did not meet any such.

*Chekenon.*—Chekenon consists of faintly yellow-colored, odorless and tasteless, well-formed six-sided prisms. It is insoluble in water, soluble in hot alcohol, ether, chloroform, and glacial acetic acid. It melts at from 203° to 204° C. The elementary analysis yielded the formula $C_{40}H_{44}O_8$, which was also confirmed by analyses of a chlorine derivative, $-C_{40}H_{43}ClO_8$. This chlorine substitution product is secured by the heating of chekenon in a tube hermetically sealed by melting to 100° C. with a saturated solution of chlorine gas in chloroform. The substance crystallizes in beautiful yellow six-sided scales, with a melting-point of 180° to 181° C. Other derivatives of chekenon could not be obtained. It belongs to the list of indifferent vegetable principles, and strongly resists the action of chemical agents. The entire yield of pure chekenon consisted of about forty grammes from fifty kilogrammes of leaves.

*Chekenic Acid.*—This substance may be completely separated from the amorphous cheken bitter only with extreme difficulty and considerable loss. Altogether, I obtained only about thirty-five grammes of the pure substance. Chekenic acid crystallizes in faintly yellow-colored, well-developed scales; is devoid of odor and taste; readily soluble in hot alcohol, ether, chloroform, difficultly soluble in cold alcohol and petroleum ether. Hot water dissolves slight quantities, which, on cooling, separate from the solution. Chekenic acid melts at 224° to 225° C., and with careful heating sublimizes several degrees above the melting-point. The elementary analysis yields the very simple formula $C_{12}H_{11}O_3$.

When bromine is permitted to act on chekenic acid, there result two crystalline bodies free from bromine (probably products of oxidation), of which one melted at 165° C., the other at 195° C. The elementary analysis of these substances, which were present only in small quantities, gave variable results.

Two acetyl compounds were successfully formed. The first, $C_{14}H_{13}O_4$, I secured by heating chekenic acid with acetic anhydride on the reflux condenser, after recrystallizing from absolute alcohol in long, almost colorless needles, which disclosed the melting-point of 142° C.

The second acetyl compound, $C_{16}H_{15}O_5$, resulted after heating chekenic acid with acetic anhydride and dehydrated sodium acetate in small, snowy-white, loose needles, which melted at 167° C., and are soluble with difficulty in cold alcohol, readily soluble in hot alcohol, chloroform, glacial acetic acid, and benzol.

Other derivatives of chekenic acid, which would have enabled me to determine its molecular weight, I could not obtain.

Chekenic acid dissolves in aqueous alkalies with a yellow color, and seems to form combinations with bases, which, just as, for example, that with magnesia, are readily decomposed, even by the carbonic acid of the atmosphere, accompanied by deposition of crystallized chekenic acid.

*Cheken Bitter.*—The bitter principle of cheken-leaves is amorphous, of yellowish-brown

color, insoluble in water and petroleum ether, readily soluble in alcohol, ether, glacial acetic acid, and benzol. It is separated in flakes from alcoholic solution by water, particularly by water containing acid. The melting-point is about 80° C. The taste is unusually intense and repellingly bitter, the odor peculiarly unpleasant. Experiments on animals showed that the cheken bitter possesses no kind of poisonous action.

*Chekenetin.*—Of this interesting body I, unfortunately, obtained only the slight yield of 1.7 grammes. It crystallizes out of glacial acetic acid in yellowish-green brilliant needles. The elementary analysis yielded the simple formula $C_{11}H_7O_6 + H_2O$. The alcoholic solution of the chekenetin gives with acetate of lead a fine red precipitate, which, however, on exposure to light soon becomes darker, and finally discolored. Very noteworthy are the color-reactions which chekenetin exhibits when subjected to the action of alkalies. If small quantities of chekenetin are triturated with water and traces of alkali added, preferably ammonia, an intensely emerald-green color at once appears, which gradually changes, at first into indigo-blue, then into violet, and finally into the red color of onion-peel.

Chekenetin decomposes on heating in a capillary tube, with accompanying carbonization, before melting.

By boiling of chekenetin with acetic anhydride and sodium acetate I obtained a colorless acetyl compound, melting-point 210° C., crystallizing from alcohol in fine needles.

Unfortunately, I had no material for a more thorough investigation of this coloring principle, which, as I believe, is not far removed from the group of quercetin. The unusual instability of the substance is the reason why it is so difficult to secure larger quantities.

Of the constituents of the cheken-leaves found by me, the ethereal oil alone offers medicinal interest.

LEIPSIC, PHARMACOLOGICAL INSTITUTE, March, 1888.

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## *SULPHUR IN DIPHTHERIA AND AS A GERM-DESTROYER IN DISEASE.*

III.

BY H. VALENTINE KNAGGS, M.R.C.P., F.R.C.S., LONDON, ENGLAND.

(Continued from page 231.)

IT so happened that a copy of Dr. Dewar's brochure on the uses of sulphurous acid gas found its way into the hands of a neighboring practitioner,—Dr. Pairman, of Biggar. It evidently attracted his notice, for a year afterwards (*i.e.*, in 1867) Dr. Pairman himself published a pamphlet on the same subject in which he makes reference to the introduction of the method by Dr. Dewar. This work was evidently written, to judge from its context, in a popular style, and is also, I believe, out of print. As many of the statements are remarkable ones, and are not found in Dr. Dewar's book, it may be well to give a few quotations. It was entitled "The Great Sulphur Cure brought to the Test and Workings of the New Curative Machine proposed for Human Lungs and Wind-Pipes."

The latter part of the title, although apparently a high-sounding one, refers to a simple piece of apparatus for spraying the throat in various morbid conditions occurring in that portion of the human frame.

"To a non-medical reader," says Dr. Pairman, on page 7, "it may appear surprising that similarity can exist between a horse's greasy heels and smallpox, or common 'itch' and Asiatic cholera, or what curious logic implies that if sulphur be a grand specific for the 'itch' it should be equally infallible for cattle-plague, cholera, diphtheria, and the like, all resembling that humble eruption, he may think, in no earthly respect whatever. This, however, is a great mistake. If any sophism can resist this reasoning, I know not where it is to be found. For, however these diseases may differ in some trifles, the grand essential point remains that *they all alike take their origin from a parasitic source.* With less fatality and less flourish of trumpets in some than in others, the common parentage of all is minute microscopic living things, vegetable or animal, that grow and breed like other creatures. Diphtheria is as surely a French mushroom, vegetable and alive, as anything of the kind ever kicked aside by human foot. *Ergo*, if sulphur kills or cures one parasite or fungus, why not another? The same poison which destroys a wasp is very likely to kill a flea. Thus the respectable and maligned malady the 'itch' promises to become the greatest instructor in the whole theory and practice of therapeutics which the world has ever seen."

*Why Abate the Smoke Nuisance?*—"I have repeatedly had asthmatic patients," says the same author, "who could not stand the pure and salubrious air of the country, but could breathe with freedom in the very heart of smoky London. This used to astonish me. The smoke of a large city is not so bad a

thing as we have hitherto supposed. What with one disinfectant in the shape of carbon and another in the shape of sulphur-fumes, it is nothing but a great vapory sheet spread by a kind Providence as a protecting mantle over the inhabitants, but for whose benignant influences fever, plagues, throat and lung affections might riot more abundantly than they do in such congregated masses of human beings."

It is certainly striking that the death-rate of so densely populated and so smoky a city as London should, relatively speaking, be so low, and that the city generally should prove so healthy. To a certain extent this might be accounted for by the fact that an enormous quantity of soft coal, with its accompanying smoke, is daily consumed. However disagreeable this smoke or fog may be to its inhabitants, the disinfectant properties of the unburnt particles of carbon, the carbolic, sulphurous, and other vapors, must of a necessity exercise a beneficial influence and diminish the vitality of any germs that may be present in the air.

The sulphurous and somewhat irrespirable atmosphere of the underground railroad, whatever its discomforts may be to the passengers who travel through its miles of tunnels, does not appear to exert any very bad effects on the employés of the line, and especially the engine-drivers and stokers of the trains, for statistics compiled some years ago would tend to prove that they live, on an average, to a greater age than do the employés of other lines.

We read also, as a matter of history, during the great plague of London in 1664–65, that coal-fires were kept up night and day to purify the atmosphere and to prevent the spread of infection, just as in recent times it has been stated *that sulphur-fires were found efficacious in warding off epidemics of cholera in India* (*Lancet*, 1884).

Although the great fire of London, occurring shortly after this plague, doubtless did much to destroy subsequent infection, yet, explain it how one will on the grounds of improved sanitation, etc., I do certainly agree with Dr. Pairman that in our densely-populated cities we owe much of our freedom from similar plagues, or even from severe epidemics, to the so-called smoke nuisance.

*Sulphites in Yellow Fever.*—In an article extracted from a Jamaica newspaper, and copied into the *Edinburgh Medical Journal* of October, 1867, we find an eminent physician, Dr. Alexander Fiddes, proclaiming to the whole profession that in their future treatment of yellow fever (so extensively fatal in that island) they "must throw aside their calomel and quinine, etc., and confine themselves in the way of medicine to a dose of castor oil to begin with, and then 20-grain doses of the sulphite of sodium, potassium, or magnesium every two or three hours."

I would mention incidentally that the sulphite and hyposulphite of sodium as remedies to effectually destroy such germs as sarcinæ and to check gastric fermentation are well known. The latter salt is decomposed on coming into contact with the acids of the stomach, and free sulphur and sulphurous acid are evolved.

In a recent issue of the *Chemist and Druggist* (March 3, 1888) also, it is stated that "three or four consecutive doses of sodæ hyposulph., ℥ii; pulv. gent., ℥i; et sodæ chlor., ℥i; omni mane, has been found *the most successful treatment for anthrax*, or, perhaps we had better say, a lower average of losses has followed where this has been adopted. The dose is best given in warm ale or water, for, although the sheep will eat it with food, it is difficult to apportion the amount when feeding out of troughs together."

In discussing the treatment of yellow fever by sulphites, Dr. Pairman says, "May we not anticipate a great mitigation of fevers generally, cutting others short, etc., *from sulphur fumigation?* Dr. Alexander Fiddes seems to prove this. What is the mitigation of yellow fever by sulphites but, according to his own theory, sulphurous acid gas in the blood producing its natural effects; and what more natural and easier mode of getting it there than by absorption through the lungs? Does not inhaled vapor of alcohol make people drunk? and breathed vapor of turpentine show itself in the urine? Thus fumigation seems better in some respects than ventilation itself. Ventilation only pitches the enemy out of the window and prevents intruding additional doses of the fever poison, the same poison that laid the patient low. But while fumigation can do as much as this, if it really be absorbed, it attacks the enemy also in the blood itself. This is dealing with fever poison and the blood as any rational man would deal with arsenic and the stomach, supposing that the stomach was always taking in some additional arsenic at every meal,—first, purify the food; second, pour antidotes into the stomach itself."

Sulphur can be administered in germ-dis-

eases generally in a variety of ways; a particular method being selected to suit the requirements of each type of complaint. It can be used as follows:

1. In the form of a *mixture* suspended in glycerin, and rendered palatable by the addition of chocolate powder, cinnamon-water, or other flavoring agents. If the sweet taste of the glycerin be objected to, as is witnessed in some few instances, chloroformated mucilage (three minims to each ounce) is a good unsweetened substitute.

2. As *lozenges or pastilles*, each containing about three grains. This is a very excellent method of administering this remedy to children. The mixture or lozenges are especially indicated in acute cases when it is highly desirable to get the system rapidly under the influence of the drug.

3. As *vapor*, evolved by burning a sufficient quantity of the mineral in the sick-room. Most useful in pertussis and phthisis.

4. Combined with a base as *salts*, such as the sulphides and bisulphides, sulphites and hyposulphites, sulphates; or *compounds*, obtained by mixing sulphur with Chian, or ordinary oil of, turpentine, etc. These answer best in chronic complaints where the remedy is required to be continued for any length of time.

5. As *enemata*, containing sulphide of ammonium, etc., or as gaseous enemata, according to the plan of Bergeon.

In acute specific diseases, such as occur principally among children, sulphur, in one form or another, will be found an invaluable remedy. It does not, according to my experience, greatly curtail the duration of the disease, or act in every instance as a preventive unless given before the incubation stage. The spores of the specific virus which are uninfluenced by the remedy necessarily take a certain time to develop, and until they have done so the disease will assuredly continue. Sulphur is decidedly instrumental in mitigating the severity of the symptoms. It rapidly lowers the temperature, and exerts a marked effect in preventing troublesome complications and sequelæ, which are so apt to occur in these cases. It converts, in fact, a severe and often dangerous specific malady into one of a comparatively mild and harmless type. Hence the mortality in cases so treated is practically *nil*. This is a bold statement, perhaps, but it has been confirmed by many careful and evidently scrupulous observers. The longer I use this remedy the more I am convinced of its truthfulness.

*Sulphur in Scarlatina.*—This specific germ-disease is greatly prone to be followed by severe and often lasting sequelæ, especially in delicate or strumous subjects. These troubles can often be prevented, or at least mitigated, by the timely administration of sulphur. I know of no other remedy which is capable of acting with such uniform certainty, and of so satisfactorily tiding the patient through a dangerous crisis.

Dr. D. H. Sheffield, writing to the *British Medical Journal* in 1881, states that he has obtained very favorable results from the use of bisulphide of sodium in scarlatina and diphtheria. He prescribed it internally in doses of ½ grain every hour. It had a marked effect in cutting short the disease, the mortality was very light, and complications were infrequent.

Sulphur, in my opinion, is especially indicated in severe forms of the complaint, where the throat symptoms are marked, where the temperature is high, or when the patient is strumous or otherwise unhealthy. Under the influence of this drug the temperature falls rapidly to normal and the throat affection is speedily relieved. The duration of the contagious period of the disease is often materially curtailed. Desquamation, which is slight, occurs at a much more early period than usual. It has been my practice to administer 3 grains of sulphur hourly at the onset, and to diminish the frequency of the doses in proportion as the symptoms improve and griping pains make their appearance. Although I have had no experience with the bisulphide of sodium, I believe it to be equally efficacious.

*As a Tentative Remedy for Hydrophobia.*—Fortunately for the human race, hydrophobia is a disease of exceeding rarity. It is only from the reports which appear from time to time in the journals that we are enabled to gather with any degree of certainty the few facts that are known concerning its ravages. Medical men, in the ordinary way of practice, usually go through life without seeing a case of it. As M. Pasteur's inoculations as a so-called preventive and cure of this complaint have of late attracted much attention, and have, at the same time, proved unsatisfactory, I would venture to suggest that a trial of sulphur and the sulphides, given for a prolonged period of time, be made.

From the many observations of scientific men it has been clearly shown that this disease originates from the ravages of a microbe, which is characterized by its relatively long

period of incubation in the system. In order to arrive at any definite conclusion as to the best means of coping with the disease, it is necessary to contrast its various symptoms with those of other acute disorders of a similar nature in which the symptoms are produced by some morbid perversion of the central nervous system.

Whooping-cough, for instance, which consists of spasm of the laryngeal muscles, is very similar. In tetanus also the muscles of mastication are principally affected, although this spasm may finally extend to any part, or even to the whole, of the body. These two diseases, as regards the action of remedies, may well be contrasted with the spasmodic affection of the muscles of deglutition occurring as a marked sign of hydrophobia. It stands to reason that any information concerning the successful treatment of whooping-cough or of tetanus ought also to prove serviceable as a guide to the management of hydrophobia. A remedy which exerts a specific action on the one would in all probability be of equal value in the others.

Even at the present time the diseases referred to are more frequently treated by sedative medicines, such as morphine, chloral hydrate, bromide of potassium, and the like, rather than by powerful germicides. Drugs of this description, although they may in some instances possess antiseptic properties, are usually found to act by exerting a depressant or inhibitory effect upon the nervous centres. Their action on the microbes themselves is, practically speaking, *nil.*

With increasing knowledge, however, the germ theory has become more fixed in our minds, and greater attention has been given to the use of antiseptic remedies during the last year or so. Whooping-cough has been successfully treated by causing the patient to live in an atmosphere saturated with carbolic acid vapor. By the internal use of germ-destroying agents of variable power, such as carbolic acid, quinine, arsenic, etc., the long duration of this disorder has been often materially curtailed and its severity greatly mitigated.

*Sulphur exerts a Specific Action in Pertussis.*—The influence of this powerful germicide in whooping-cough is little short of magical. In my opinion it far eclipses the remedial agents above referred to. A recent medical authority has stated that the use of sulphur vapor, when burnt from time to time in the room occupied by a sufferer from pertussis, immediately controls the violence of the characteristic cough and rapidly cures the complaint. The internal exhibition of this remedy is, however, quite as efficacious as the vapor, but the two methods may sometimes be employed together with advantage. My plan is to give one large dose of 15 grains, which at once arrests the troublesome spasmodic cough, and to follow it up by repeated small doses of from 1 to 3 grains every two or four hours, so as to keep the system under the influence of the drug until all symptoms have ceased. Although, owing to the presence of undeveloped spores, the disease is not cured right away, the severity of an attack of this painfully-distressing affection, as with scarlatina, is at once mitigated. It is thus robbed of half its terror. The continuance of the remedy for a sufficiently long period of time is necessary to effect a cure, which, relatively speaking, is a rapid one when compared with other remedies.

Even ordinary alum (the sulphate of ammonium and aluminium) is a well-known and time-honored remedy for this complaint. It has been found of great service as such, and owes its virtues, no doubt, to its sulphur.

With respect to hydrophobia and tetanus, I am unable to find any record that they have ever been treated by sulphur, but as they both exhibit so decided an analogy to pertussis, there should be no reason why they should not be equally amenable to its influence. Is it not worth a trial in such cases? It can do no possible harm. Personally, I should not hesitate to at once make use of the knowledge I have gained in this method of treating germ-diseases during the last few years. Where an individual had been bitten by an undoubtedly rabid animal, I should at once, by way of preventive or abortive treatment, put the patient on the remedy. It has been shown that this mineral or its vapor has little or no influence on spores, but rapidly kills the germs themselves. It would be necessary in the case of hydrophobia to continue the use of the remedy, possibly in conjunction with vapor-baths, for some considerable time, in order that the microbes when evolved from their spores may be destroyed. This would entail no inconvenience to the person taking it, for a few doses of sulphide of calcium or bisulphide of sodium exhibited daily would doubtless suffice. The patient would then have the satisfaction of knowing that every portion of the body into which the hydrophobic germs were capable of penetrating would be continually saturated with this drug or with the gases evolved by it, in the pres-

ence of which no fully-developed micro-organism of any description can exist for any length of time.

Should the disease have actually supervened, I would give 3 grains of sulphur suspended in glycerin every half-hour, and should look forward with confidence to a favorable termination of the case. Here, as in tetanus, it is a question of rapidly destroying these germs before fatal symptoms ensue. When, however, the disease is so far advanced that the patient is unable to swallow, the employment of sulphur fumigations and enemata of sulphide of ammonium or other soluble sulphur compounds might be tried.

*To prevent Pitting in Smallpox.*—Owing to the isolation of cases of this disease it is but rarely seen in private practice, so that we can seldom adequately watch the effects of any particular plan of treatment. I have had no opportunity of testing the efficacy of sulphur internally as a remedy for variola. I believe firmly, however, that if given in repeated small doses to persons so suffering we should neither see nor hear more of the horrible disfigurement caused by this loathsome malady.

By trusting to good sanitation, the avoidance of overcrowding, the rigid isolation of infected persons, etc., we can in great measure keep under the disease. Vaccination also has done much for the human race in eradicating smallpox, of preventing lifelong deformity, as well as in preserving life. To this we must, of course, still look for our future protection. A remedy, however, is certainly required which is capable of adequately preventing sequelæ and excessive mortality among the unvaccinated. Sulphur or mercury are the only drugs of which I know that are at all likely to effect this purpose.

According to experiments made by Dr. Midavine in 1841, it would appear that sulphur possesses the same efficacy as mercury in arresting the development of the smallpox pustule. Dr. Midavine "employed an ointment composed of two to two and a half drachms of flour of sulphur to an ounce of lard, and with this rubs lightly, thrice a day, all parts of the body on which pustules exist. The nearer the pustules are to the period of their first appearance the greater the chance of success; the papules then contract, become dry, and fade away. Even in confluent smallpox the patient quickly recovers his appetite and asks for food."

"At the present time," states Dr. Dolan in the *Provincial Medical Journal*, February, 1888, page 79, "there is every opportunity of trying the application of a solution of sulphide of calcium to mature the eruption and to give ease. We have used the remedy in several cases with benefit. The first case above mentioned (a tramp) was a severe one of confluent smallpox. The face was swollen; the eyes closed. The face and body were painted with the golden lotion known as liq. sulph. cal. (the specific for scabies) weakened with water 1 to 2. The remedy was effective. The pustules shrivelled up, the face settled down, and the man was soon able to open his eyelids." We believe it may be applied in any stage of the disease; this has yet to be tested.

It seems to me that if by the mere local application of sulphur ointment or of sulphide of calcium paint the development of the smallpox pustule, with its subsequent scarring, can be greatly impeded and even prevented, how much more is the internal exhibition of the same remedy, and its direct application *through the skin*, likely to prevent this after-disfigurement, and effectually destroy the microfungi which are known to induce this horrible germ-disease in man.

*Sulphur and Malaria.*—Although sulphur has yet to be tried in ague, the few facts concerning its action on malarial poison are very significant. The following items are extracted from the *Lancet* of October, 1882:

"The laborers in the sulphur-works in Sicily, even in those which are situated in the low-lying malarial districts, are extremely free from remittent fever, a disease which, among those who pursue other occupations, is very prevalent in the island, particularly in the pestilential plains.

"In Ethiopia certain elephant-hunters expose their naked bodies to a fumigation of sulphur, in the belief that this will preserve them from the effects of malaria,—which in some of the unhealthy districts is so fatal that not long ago a whole caravan perished from this cause,—and certainly they are said to enjoy an almost complete immunity from the disease."

*Sulphur in Scrofula.*—This mineral is generally acknowledged to be one of our best remedies for scrofula. This will in great measure account for its power of preventing the sequelæ and complications of acute specific diseases, especially if occurring in patients predisposed to the diathesis.

"Sulphide of calcium," states Dr. Ringer in his "Handbook of Therapeutics," "in doses of from $\frac{1}{10}$ to $\frac{1}{2}$ grain, given frequently during the day, will usually cure with comparative

rapidity the indolent and chronic forms of scrofulous abscesses and enlarged glands, especially those which are situated in the region of the neck, and succeeds even when iodine has failed."

*Professor Clay's Treatment of Cancer.*—It will be remembered by many of your readers that in the year 1880 the medical world was startled by the discovery of what was supposed to be a cure for cancer. A full account of the treatment was published by Professor Clay, of Birmingham, its originator, in the *Lancet* of March 27, 1880, when the remedy was found to consist of a mixture or pill *containing Chian turpentine and sulphur.*

The formula of the mixture was as follows:

℞ Ethereal solution of Chian turpentine (℥i in f℥ii pure ether), ♏xv;
Mucilage of acacia, ℥ii;
Syrup, ♏xxx;
*Sublimed sulphur*, gr. iiss;
Distilled water to ℥i.
Dose.—℥i three times daily.

The formula of the Pilula terebinthinæ Chiæ was:

℞ Chian turpentine, gr. iii;
*Sublimed sulphur*, gr. ii.
Make one pill.
Dose.—Two every four hours.

Professor Clay, in a subsequent paper (October, 1880), declared that while the discontinuance of the sulphur had been advised in order to make the mixture more elegant and miscible, he believed that the preparation was more efficient, when it was well tolerated, if prepared with the sulphur. The Chian turpentine treatment was extensively tried in the cancer wards of the Middlesex Hospital and elsewhere, and was declared to be of no use whatever in such cases. As Dr. Clay laid great stress upon the fact that Chian turpentine was the curative agent and not the sulphur, it is quite possible that in these subsequent trials the latter was omitted. Hence, from my point of view, this would be a principal cause of its failure.

Dr. Clay should have rather stated *that his remedy was sulphur and not Chian turpentine;* for it appears to me to be highly probable that the latter brings out and increases in some ill-defined manner the curative action of the former medicament, when used as a remedy for cancer, just as with the old-fashioned "Dutch drops" (which is said to be composed of 1 part of balsam of sulphur to 5 parts of turpentine, and to be credited with detergent, stimulant, and diuretic properties) the sulphur balsam increases the remedial powers of the turpentine, or *vice versa.*

*Sulphide of Calcium in Elephantiasis.*—Dr. P. D. Anthonisz, writing to the *British Medical Journal* (December 24, 1887) from Ceylon, claims to have obtained remarkable results in this disease by the use of sulphide of calcium. The complaint is said by Dr. Mason, of China, to be due to the ravages of a parasite known as the *Filaria sanguis hominis.* After referring generally to the unsatisfactory nature of various modes of treatment, he states: "I tried it first in a case of a young woman, who came to me with recent inflammation of the leg, with considerable swelling, and enlarged and painful glands of the groin. She was slightly strumous. I ordered 1-grain pills of the sulphide of calcium, with an ointment for the groin of 2 grains of iodoform, with an ounce of lard or vaseline. To my great surprise, the swelling subsided in less than three weeks, and when she called for some other ailment three months after, I could not say which had been the swollen leg. She took for the first week 1-grain sulphide of calcium pills twice a day, and after that 2-grain pills twice a day until the swelling subsided. This induced me to give the remedy a more extensive trial. Two lads, about 17 years of age, who had the disease for several years, were put under a like treatment. One of these had a foot so swollen that he was obliged to have a shoe for it very much larger than the other. After having been under this treatment for about a year and a half, the swollen foot was almost the same size as the other.

"Several cases were treated in this manner by some of my medical friends, Mr. Thomas among others, and the same results followed in their hands. At the present moment I have a man, between 50 and 55 years of age, who had both his legs enlarged, one of them being nearly as large as his waist, and the other only a little smaller. It is now more than a year since he has been put under treatment, and at the present time his legs are nearly the size of his thighs. I am in hopes of effecting a complete cure in another year or so. The duration of the disease in this case is about thirty years in one leg and about twenty years in the other.

"I would like to hear that this practice for elephantiasis is tried in other countries where the disease is common. The remedy should be persevered in for a lengthened period, and not given up until the disease subsides. It is

necessary to suspend the use of the sulphide of calcium when it affects the stomach and causes irritation, going on with it again after the irritating effects have subsided."

*Sulphur in Cholera and Intestinal Disorders.*—Sulphur will usually be found to act on the intestinal canal in a very similar manner to mercury.

The purgative action of moderate or large doses of calomel, or hydrarg. c. creta, is well known, while, according to Dr. Ringer and others, the same medicaments, when employed in minute doses, exert a decided effect in arresting diarrhœa, and this even when astringents and other remedies have failed.

In precisely the same way, when sulphur is administered in moderately large doses of 60 grains or upwards, it acts as an efficient laxative, unless, as is the case in febrile diseases originated and kept up by the influence of a germ virus, a marked tolerance and absence of purgative action has been established. When given in minute doses (varying, of course, according to the susceptibility of each individual), the same drug has a marked effect in arresting many of the ordinary forms of diarrhœa. Moreover, the constipating tendency of a diet composed largely of such articles as milk or eggs is well recognized, for they are known to contain a variable proportion of the mineral, by means of which they are normally and naturally preserved.

An interesting work, entitled "The Leading Phenomena of Epidemic Cholera," was published in 1848 by Dr. A. Blacklock. The author considered the disease to be caused by a disturbance of the electrical condition of the body, by which the mucous surface of the large intestine is in a positive condition and secretes acid, while the mucous surfaces of the stomach and bronchial tubes and the skin are in a negative state and secrete alkali. The result of this disturbance is a high excitement of the ganglionic system of the abdomen, causing a rapid disintegration of tissues, while the spinal respiratory system is in a state of great depression and permits carbon to accumulate in the blood. This electrical disturbance of the large intestine he supposes to be due to an absence of sulphuretted hydrogen from the large intestine, while the depressed state of the spinal respiratory system is caused by a want of free electricity in the atmosphere.

The remote cause of the disease is supposed by the author to be the habitual use of a diet deficient in sulphur, the result of which is the want of the sulphuretted hydrogen required to preserve the colon in its normal electrical condition. This hypothesis he endeavors to substantiate by an inquiry into the staple food of the countries most liable to cholera. All the phenomena of cholera are regarded as secondary to the intestinal irritation.

*To arrest the colonic excitement he advises enemata of hydrosulphuret of ammonium, one ounce to the quart of water.* He believes it to be useless to endeavor to control the evacuations by astringents. The only way to do this he conceives to be by restoring the normal electrical conditions, the disturbance of which has given rise to them. For this purpose, as well as to restore heat, he recommends the use of electricity. Opium is pronounced to be a poison. Of calomel, he states that it is useful only as the cholera symptoms are subsiding; before this it is useless.

When the cramps and vomiting and purging have ceased he gives a drachm of sulphur; two hours afterwards 10 grains of calomel, with 2 of opium.

His suggestions for the prevention of the disease are based upon the hypothesis of the deficiency of sulphuretted products. Accordingly he uses sulphur as a prophylactic, and urges the employment of a diet rich in sulphurous ingredients; with such he bids defiance to the epidemic. (*Half-Yearly Abstract of the Medical Sciences*, 1849.)

Another very instructive pamphlet on "Epidemic Cholera" was written in 1865 by Dr. J. Groves. The author expresses himself strongly in favor of the usefulness of small doses of sulphur in intestinal disorders. His favorite prescription was:

℞ Precipitated sulphur, ℥iv;
Bicarbonate of sodium, ℥iv;
Tinct. lavand. co., ℥xxiv;
Water, ℥lxxii.

The powders to be well triturated together and the tincture gradually added, and then the water.

Dose.—Two teaspoonfuls every two or three hours or oftener. Each dose will be equivalent to about three grains of sulphur.

*Conclusion.*—It has been my endeavor in compiling and bringing together these facts to demonstrate the extraordinary value of a group of powerful remedies which have of late years undeservedly fallen into desuetude. It is my confident hope that American physicians, who have the credit of giving any remedy a fair and thorough trial, will work out and solve the problem of the future treatment of germ-diseases, so that the world may know *whether sulphur does or does not possess the*

*remarkable curative properties hitherto attributed to it.*

It is my firm conviction that nature, in her extensive utilization of the antiseptic properties of sulphur in the preservation of the tissues and secretions of plants and of the living body, clearly demonstrates to us the value of this mineral as a remedy for diseases originated and caused by germs. When, therefore, the system is bereft of its natural deodorizing constituents, or when the germs of fungoid diseases have, by reason of their rapid growth, obtained the upper hand over them, it certainly behooves us to restore these constituents to the economy, and this we do by the appropriate administration of sulphur.

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## *EXPERIMENTS TO DETERMINE THE INFLUENCE OF ETHERIZATION ON THE NORMAL BODILY TEMPERATURE WITH REFERENCE TO THE USE OF EXTERNAL HEAT.*

By H. A. Hare, M.D. (Univ. of Pa.).*

THE common custom of surgeons the world over of applying heat to the body and limbs of a patient who has just passed through an operation is so universally recognized that it needs no word of encouragement, but the following results obtained by Dr. Joseph Leidy, Jr., one of the resident physicians, and myself in the University Hospital are of interest and importance.

I have experimentally determined that it is possible to lower the normal rectal temperature of the dog as much as from 8° to 10° Fahr. by continuous etherization for an hour, giving two drachms of ether every five minutes after the animal has been put thoroughly under the anæsthetic influence. If a fall of temperature proportionate to this takes place in the human being, the present custom of applying heat to the patient is closely allied to locking the door after the horse is stolen, and the results given in the two tables following seem at least to afford sufficient evidence of the propriety of using external heat not after but *during* anæsthesia.

This table Dr. Leidy has kindly put at my disposal. The temperatures were in every instance taken in the axilla.

| No. | Name. | Operation. | Temperature before. | Temperature after. |
|---|---|---|---|---|
| 1 | H. W. C. | Anal fistula. | 99° | 96.2° |
| 2 | M. S..... | Carcinoma. | 98.6° | 95° |
| 3 | R. E..... | Arthritis of knee. | 99.1° | 96.4° |
| 4 | B. M. B.. | Arthritis of knee. | 98.8° | 95 8° |
| 5 | M. H..... | Sarcoma of both testicles. | 98.6° | 94.2° |
| 6 | C. H. S.. | Vesical stone. | 99° | 97.1° |
| 7 | B. I..... | Arthritis of knee. | 99° | 96.8° |
| 8 | L. C. C... | Vesical stone. | 98.6° | 96.4° |
| 9 | C. I. K... | Traumatic epilepsy. | 98.1° | 95.4° |
| 10 | F. B..... | Necrosis of tibia. | 98 5° | 97.2° |
| 11 | A. M..... | Necrosis of phalanx. | 98.2° | 96.8° |
| 12 | T. S..... | Renal calculus. | 99.4° | 96.8° |
| 13 | T. B..... | Nasal sarcoma. | 98.4° | 97.2° |

Average fall of temperature over 2½° Fahr., the greatest fall being 4.4° Fahr., the least 1.2° Fahr.

The following table was compiled by myself through the courtesy of Dr. D. Hayes Agnew.

The temperatures were all taken in the *rectum*, unless otherwise noted.

Average fall of temperature 2.32° Fahr.; greatest fall, after operation for carcinoma of breast, 3.15° Fahr.; the least, .8° Fahr., after insertion of drainage-tube for empyema.

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| No. | Sex. | Operation. | Temperature before. | Temperature after. | Duration of etherization. |
|---|---|---|---|---|---|
| 1 | Adult, M. | Necrosis of femur. | 90.5° | 98° | 1¾ hours. |
| 2 | Adult, F. | Carcinoma of axillary glands. | 100.15° | 98.5° | 1 hour. |
| 3 | Adult, M. | Excision of the knee. | Mouth, 99.4° | Mouth, 97.2° | Very short. |
| 4 | Adult, F. | Abscess of abdominal wall. | 99.4° | 98.4° | 1 hour. |
| 5 | Adult, F. | Caries of vertebræ. | Axillary, 98.4° | Axillary, 97° | ¾ hour. |
| 6 | Adult, F. | Carcinoma of breast. | Axillary, 99.45° | Axillary, 96.3° | 1 hour. |
| 7 | Adult, F. | Carcinoma of breast. | 98° | 95.4° | ¾ hour. |
| 8 | Adult, M. | Hypospadias. | 99.2° | 96.3° | ¾ hour. |
| 9 | M., æt. 6 months. | McEwen's, for deformity of tibia. | 99.2° | 97.4° | ½ hour. |
| 10 | Adult, M. | Necrosis of femur. | Mouth, 98.4° | Mouth, 97.2° | ½ hour. |
| 11 | Adult, M. | Epithelioma of nose (plastic operation). | Axillary, 100.2° | Axillary, 99° | ¾ hour. |
| 12 | M. | Excision of hip. | 102° | 100.2° | 1 hour. |
| 13 | M. | Empyema, drainage-tube. | Axillary, 98.4° | Axillary, 97.6° | ½ hour. |

These two tables, giving the records of twenty-six operations, point very conclusively to the fact that during anæsthesia the bodily temperature invariably falls to a considerable extent. The question has been raised as to whether the ether or the operation is responsible for this, and I think the answer is that both are factors in the fall. That simple etherization may lower temperature is, however, most certain, and, as I have already stated, in the normal dog the fall is enormous.

It has been claimed that the chilling so commonly found after etherization is due, at the present day, rather to the profuse irrigation with antiseptic washes than the ether.

That this is not the chief cause, however, is proved by the fact that the quantity of irrigation has absolutely nothing to do with the fall. Thus, in one case where the amount of irrigation was enormous, the temperature fell but slightly, while in another instance, with no irrigation of any amount, the temperature fell most decidedly. If the patient lies in a pool of bichloride solution, from which his clothes rapidly become saturated with water, of course the dissipation of heat is enormous, but the point I desire to insist upon is that the mere running of a solution through a superficial wound, in distinction to a body cavity, does not lower the temperature to any appreciable extent.

Practically, the fact that the operation aids in producing the fall influences in no way the importance of the use of heat; experimentally, the question as to the exact effect of the ether and operative shock is of course more important. The shock which an operation in a body cavity produces is of course greater, as a rule, than that caused by an operation on an extremity, but it seems probable that quite as much credit is given to this factor as it deserves, for it should be remembered that when under the full influence of the anæsthetic, the centric nervous system is incapable of recognizing injury to its tributary parts. On the other hand, every surgeon sees patients daily in whom pain is felt in the spine after operations, and as only the brain is affected by *light* anæsthesia, while the cord escapes, it may be that the spinal thermogenetic centres are affected by the pain impulses coming from the periphery. The difficulty of studying the matter with the calorimeter is so great, where ether has to be given, that it is practically impossible and not necessary for the truth of the clinical deductions which I desire to bring forward here.

The cause of the fall may, therefore, be considered chiefly due to the anæsthetic; and, secondly, to the operation. The manner in which the anæsthetic acts is, of course, unknown. It may affect the nervous centres, governing heat production and dissipation, or simply by its effect on the circulation and its evaporation influence the temperature. The former seems the more probable, but the latter must certainly also be a factor.

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### *SUBLIMATE AND COCAINE IN OPHTHALMIC SURGERY.*

An interesting paper on the value of sublimate and the dangers of cocaine in ophthalmic surgery was recently delivered before the Society of Physicians of the canton Zürich, in Switzerland (*Med.-Chir. Rundschau*, January, 1888). The lecturer was PROFESSOR HAAB. He said that a weak solution of sublimate (1 to 5000) was most valuable in eye operations in rendering the wound perfectly antiseptic. Its action is more prompt than that of a salicylic solution which he previously had always used. Care, however, must be taken that none of the sublimate solution enters the anterior chamber of the eye, as it may cause a cloudiness of the cornea. The value of strict antiseptics in ophthalmic surgery is clearly shown by the results of Dr. Haab's operations. Over five hundred major operations were performed by him, among which were one hundred cases of cataract, and of all these there was not one which did not give satisfactory results. In every case the healing was prompt, and unaccompanied by any irritative or inflammatory symptoms.

The above five hundred cases only included such where a traumatic infection was possible. In nearly every case sublimate was used. The good results obtainable by exact antisepsis may be greatly injured by cocaine, and for this reason old solutions of cocaine, on account of mould, may become highly infectious and inflammatory, and, as it seems, can even give rise to suppuration. Therefore only sterilized solutions should be used. To insure this, the solution should contain sublimate, and besides this should be well boiled from time to time. When using cocaine for the removal of foreign substances from the eye, care should be taken that the drug is pure and sterile, as even a small incision or puncture is likely to cause unpleasant keratitis if the anæsthetic is impure.

# The Therapeutic Gazette

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## Leading Articles.

### *WATER-GAS.*

WATER-GAS, which in many parts of the United States is being introduced as a substitute for coal-gas, is prepared by several processes, the principle of all of which is the passage of superheated steam through anthracite coal at a high temperature. As the result of the decomposition a nearly odorless gas is obtained, which is chiefly composed of hydrogen and carbonic oxide, and burns with little light but with very great heat. This first product is the so-called *fuel water-gas*, and has been extensively employed for heating purposes. In order to employ it as an illuminant it is necessary to add to it certain highly-carburetted compounds, which are usually obtained by the decomposition of some of the so-called coal naphthas. Owing to the large amount of carbonic oxide which they contain both of these water-gases are exceedingly poisonous. As the fuel water-gas gives no notice of its presence in the atmosphere, save by the production of growing apathy and unconsciousness in those who breathe it, its use on a large scale is attended with a practical certainty of a large loss of life, and its manufacture and public distribution should be forbidden by law.

Illuminating water-gas is no less poisonous than the fuel water-gas, but in the process of enrichment with carburetted compound it obtains an odor which approximates in intensity that of coal-gas, and consequently gives warning of its presence in the air. It has been and is still being introduced into various cities in the United States. Whether it ought or ought not to be employed is a question of the greatest importance, and demands attention at the hands of that profession which is the guardian of the public health. When in the subsequent paragraphs of this editorial the term water-gas is used, *illuminating water-gas* is intended.

The various analyses which have been published of water-gas show that it contains from thirty to forty-five per cent. of carbonic oxide, while ordinary coal-gas has in it from three to seven per cent. of the same compound. The question of the comparative poisonous properties of these two gases evidently divides itself for discussion naturally into two parts: First, what is the result of the combustion of equal volumes of the two gases in yielding substances to the air more or less deleterious? Second, what are the comparative poisonous properties of the unburnt gases?

In regard to the first of these questions, we find that if the average composition of coal-gas and water-gas as given by Sedgwick and Nichols is made the basis of calculation, that the burning of one hundred cubic feet of the coal-gas would give rise to 55.84 cubic feet of carbonic acid gas, while the combustion of an equal volume of water-gas would generate 73.32 cubic feet of carbonic acid. Hence 55.84 : 73.32 : : 100 : 131. That is, the combustion of a given volume of the water-gas would produce over thirty per cent. more carbon dioxide than the combustion of an equal volume of the coal-gas, and would therefore contaminate about one-third more of the air of a room.

In regard to the second question, all authorities are in accord in believing that the poisonous properties of both coal- and water-gas are practically dependent upon the carbonic oxide in them, the other ingredients being so feeble in their toxic properties that they can only produce serious results by taking the place of ordinary air and thereby causing suffocation. For present purposes the two gases may therefore be viewed as dilutions of carbonic oxide. At first thought it is natural to suppose that

the poisonous qualities of any diluted toxic agent must be in direct proportion to the concentration of the poison, so that if water-gas contains five or six times as much carbonic oxide as does coal-gas it must be five or six times as poisonous. This statement does not, however, express the real truth; the noxious properties of the two dilutions not being in proportion to the percentage of carbonic oxide which they contain. When either gas escapes into a room it becomes mixed with the air, and much of it passes out through the windows, fireplaces, and other apertures. In order for acute poisoning to occur from carbonic oxide there must be a certain percentage of it in the air of the room. Now suppose that neither gas were to contain enough carbonic oxide to influence the atmosphere of the room sufficiently to make it capable of taking life. It is evident that under such circumstances neither gas would be destructive to life; but altering our supposititious case, let it be supposed that one gas contains more than sufficient poison to saturate the atmosphere up to the dead-line, while the other does not have quite enough to produce such saturation. Under such a supposition it is evident that if the first gas should contain only twice as much carbonic oxide as does the second gas it would be exceedingly misleading to say that it is twice as poisonous, the truth being that the difference in the poisonous properties was the difference between life and death, there being in one gas sufficient carbonic oxide to cause death, while there was not enough in the other to produce an immediate result. The relations between water-gas and coal-gas may be very well paralleled by occurrences in the Confederate prisons during the war of the rebellion. Around the prison was a certain line over which no prisoner was allowed to pass, the sentries being instructed to shoot any man who crossed this so-called dead-line. When a man was ten feet within that line the noxious result to him that would follow his advancing eleven feet would be truly out of proportion to that which would be produced by his advancing nine feet.

According to the general authorities, one-half of one per cent. of carbonic oxide in the atmosphere of a room is sufficient to cause death. The presence of one per cent. of coal-gas in a room would necessitate the presence of six-hundredths of one per cent. of carbonic oxide, which would not be sufficient to produce any immediate bad result. On the other hand, one per cent. of water-gas would be an equivalent to from thirty- to forty-hundredths of one per cent. of carbonic oxide in the room. It is plain that three per cent. of coal-gas in an atmosphere would do no serious injury, while but little over one per cent. of the water-gas would be required to take life. In a series of apparently very careful experiments, Messrs. R. T. Sedgwick and Ripley Nichols found that if an ordinary gas-burner, using six feet per hour of gas, were allowed to remain with the stopcock turned on, unlighted, in a compartment of ordinary size, that very rarely did more than one per cent. of gas accumulate in the room in the course of some hours. This would indicate that if an individual should go to bed and leave one burner turned on, but unlighted, the probabilities would be very large that in the morning when found his life could be saved if coal-gas were in use, but with water-gas he would of necessity perish. This *a priori* deduction has received confirmation by Sedgwick and Nichols through direct experimentation. They had two rooms prepared, in all respects as near alike as possible, and of such size as to contain seven hundred cubic feet of air each. In each of these rooms were placed dogs, cats, and rabbits, and an escape of gas was allowed from one burner. In the room in which water-gas was used, in one hour and thirty minutes the animals became delirious and some of them convulsed. In one hour and forty-five minutes all the animals were unconscious. In three and a quarter hours several of them were dead, and within eight hours all of them had expired. In the room in which the coal-gas escaped, at the end of three and a quarter hours the animals seemed only a little drowsy. At the end of eight hours this condition was exaggerated. At the end of twenty-four hours one cat and one rabbit were dead, but the other animals were not even unconscious, and, as the temperature of the night was below zero, it is probable that the deaths of the rabbit and the cat were largely caused by cold.

Professor Sedgwick also experimented upon himself, and found that exposure for less than two minutes in a room whose atmosphere contained two and a half per cent. of water-gas produced anxiety, trembling, partial loss of muscular control, slight nausea, and an after-headache of the severest character, which lasted several hours.

The introduction of water-gas into cities has always been accompanied by an extraordinary increase in the number of deaths from gas poisoning. In New York City, in the seven years terminating January 1, 1888,

there were one hundred and seventy-seven deaths from water-gas and nine deaths from coal-gas, while the number of deaths in January of this year in New York City is said to have equalled all the deaths from coal-gas in Boston in the last fifty-five years. In the five years ending January 1, 1885, there were in the city of Baltimore forty-five deaths from water-gas. In the year 1887, following the introduction of water-gas into San Francisco, the number of deaths was twelve. Eleven deaths were reported in the New York newspapers as having occurred in Chicago in 1886 and 1887. Of the exact number that really did occur in Chicago we have no accurate information.

An event which took place at Reading, Pennsylvania, while we were preparing this editorial for press, points out a very important possible danger in the use of water-gas. It is generally thought that these deaths are the result of carelessness in leaving the gas turned on, although extinguished. It would appear, however, that, owing to the variations in pressure, and probably also to the variations in the mixture of the constituents of the water-gas, or to other cause, when the gas is left burning low at night it is entirely possible for the light to go out and afterwards sufficient gas escape into the room to cause death. Thus, on March 30, in the Keystone House, in Reading, two gentlemen were found dead in their beds from water-gas poisoning, and, according to the testimony at the coroner's inquest, the gas had been left by them lighted.

Every gardener who has greenhouses in a city knows that plants in such greenhouses are quite liable to be seriously affected, or even killed, by the escape of gas into the soil from leaks occurring many feet or even yards away. Especially is this true in the winter, when the frozen top-soil prevents the ready escape of gas into the atmosphere. When it is remembered that about seven per cent. of the total products of the Philadelphia gas-works is lost through leakage, and that, consequently, many millions of cubic feet yearly escape, it is evident that there may frequently be deteriorations of health resulting from the habitual breathing of noxious gases, in which the cause of the ill health is not even suspected, much less reported. It is not possible to form any positive definite opinion as to the extent of this evil, much less to establish such opinion by definite statistical evidence. The possibility of such slow chronic poisoning is, however, worthy of having much weight attached to it.

It is evident that any danger which may now exist would be greatly increased by the substitution of water-gas for coal-gas. That these fears and deductions have a substantial basis is proven by certain occurrences in the city of Troy, in New York, in the winter of 1886 and 1887. In that city, on one occasion, in five stores located near one of the mains, the clerks and porters, about fifteen persons in all, were so seriously affected by water-gas which entered the houses through the soil from a leak in the mains that in one day fifteen persons were obliged to have medical aid, two or three losing consciousness for a time. On the evening of January 16 the inhabitants of a whole row of houses were all seriously overcome by the gas which came from a leak in the mains in the street, and but for a happy chance would probably all have perished. Fortunately, a gentleman living in the third story of one of the houses was awakened about eleven o'clock P.M. by the extraordinary noise made by his dog, and when aroused found that he and his wife, with the other inhabitants of the building, were all sick. An alarm was given and the neighbors' houses were entered by the police, who found many sick, and in one flat all the inmates were dead. That these persons did not die of suffocation, but of carbonic-oxide poisoning, is proved by the fact that the fires were burning in the stoves and the lamps upon the tables, as well as by the post-mortem appearances.

In Massachusetts the manufacture of water-gas is forbidden by law, and the attempt to have the law repealed has led to a protest against the legalization of the use of any gas which contains more than ten per cent. of carbonic oxide, the protest being signed by most of the leading physicians of the State, as well as by the various health officers and medical examiners in the various towns and counties. The College of Physicians of Philadelphia has adopted resolutions in accord with this protest, and we do not see how any one who is conversant with the history of the matter and with the results of the use of water-gas, and who has no interest in the matter, can be at discord with the opinion which has thus been authoritatively expressed in two great cities.

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### *HYDRATE OF AMYLENE.*

DURING the experiments with tertiary alcohols, made by Von Mehring and Thierfelder, it was discovered that amylene hydrate (a tertiary alcohol first prepared by Wurtz) produced continued sleep when given to rabbits.

Further experiments were made, and it was discovered that this drug had little or no effect upon the heart's action. The drug was then tried upon man, and it was seen that doses of 3 grammes (48 grains) caused a similar hypnotic action to that observed in animals. There were no unpleasant accompanying or after symptoms, and the usual period of excitement was not observed.

Extensive experiments were then made with the drug in the insane clinic of Dr. Jolly, and here the remedy proved itself to be a most reliable and safe narcotic. Among other experimenters with the drug are Professor Riegel and Dr. Georg Avellis. The latter speaks of his observations in the *Deutsche Medicinische Wochenschrift*, January 5, 1888, in the most glowing terms.

Hydrate of amylene is a colorless, watery-looking fluid with a sharp taste and smell. Specific gravity .8. It is soluble in eight times its volume of alcohol; therapeutically, Riegel and Avellis used the drug in two different forms,—in gelatin-capsules and in fluid form. The gelatin-capsules contain 1 gramme (15½ grains) of amylene hydrate each. When given in fluid form the drug was mixed with claret or water and raspberry syrup. The doses given ranged between .8 and 3.2 grammes (12 to 50 grains). The usual dose, however, was between 2 and 2.4 grammes (31 and 37 grains).

The number of experiments made with the drug were over three hundred, and the number of patients experimented upon forty.

When the use of the drug *per os* was contraindicated, it was given in the form of an injection mixed with a sufficient quantity of distilled water and gum arabic. The action here occurred with almost equal rapidity as when the drug was given by the mouth. The mucous membrane of the bowels is not in the least irritated by the drug, and in this point it is superior to chloral.

The drug was usually administered at eight or nine in the evening, and sleep was produced sometimes almost instantly, but generally in from fifteen to forty-five minutes. If large doses were given, the patient would be asleep in five to eight minutes. In a few cases the drug seemed to fail, but when given to these same subjects the following evening it had the desired effect, and caused a sleep lasting six or eight hours. As a rule, its actions were prompt and safe.

Its actions may be briefly summed up as follows:

1. Hydrate of amylene is a hypnotic whose action can be confidently relied upon when sufficiently large doses are given. Experiments have shown that it is not so strong as chloral yet stronger than paraldehyde.

2. Hydrate of amylene also acts upon persons who are accustomed to the use of hypnotics, although the dose employed in such cases must be comparatively large.

3. Sleep occurs soon after the administration of the drug, and is not preceded by any period of excitement. The sleep produced is light or heavy, according to the dose given; yet it is always easy to awaken the patient. Upon waking the patient is perfectly sensible and bright, but if not disturbed further will at once fall asleep again.

4. Sleep lasts from two to three hours if small doses have been given, or from six to eight hours under the influence of larger doses.

5. The awaking is similar to that from natural sleep. The patients feel rested and strengthened. No headache or weakness was ever observed.

6. The respiration remains unchanged.

7. The change in the pulse's frequency and in the pressure of blood is no more than that which accompanies natural sleep.

8. The patients were never observed to wake up with a bad taste in their mouths and complaining of a disagreeable smell, symptoms which nearly always follow the use of paraldehyde.

9. Whether or not a habit and tolerance for the drug may be formed remains yet to be seen. As yet, even when the drug has been used continually, an increase of dose was never found necessary.

Unpleasant accompanying effects were only observed in two cases. The first was that of a hysterical woman. After taking the drug she became very talkative, and acted as if under the influence of alcohol; the pulse was quickened and the face greatly flushed; sleep did not occur until four hours later. The other was a patient who took a moderate dose of amylene hydrate at one o'clock in the morning, and the next morning after rising he still complained of feeling under the influence of the hypnotic. This was probably due to the late hour in which he took the drug.

In three cases the drug refused to act: the first was a case of delirium during erysipelas, another in the commencement of psychosis, and the third a patient suffering from severe neuralgia. The drug was used in various cases of gastric, nervous, and circulatory troubles,—in icterus, cholelithiasis, chrysaro-

bin-dermatitis, diabetes, tuberculosis, emphysema, bronchitis, etc.

The desire to cough was lessened rather than increased under the influence of the drug. Several consumptives have stated that they slept well under its effects when not troubled with intense coughing shortly after taking the dose; if this were the case, however, they could not get to sleep for some time.

One patient declared that three minutes after a dose of hydrate of amylene had been given as an injection that he tasted it in his mouth; and it might, indeed, be possible if not probable, for the drug is eliminated through the lungs with great rapidity. The remedy was given with especially good results in icterus and other skin-affections accompanied by severe itching. Amylene may therefore ably take the place of chloral, as it has no weakening effect upon the heart, whereas the latter undoubtedly has. Therefore, also, in all circulatory troubles amylene should be given in preference to chloral, as it is well known that the latter considerably lessens the pressure of the blood.

Contraindications for the drug have not yet been observed, but in cases of severe gastric troubles and ulcerations of the pharynx it should be given per anus.

Dr. F. Gürtler (*Berlin. Klin. Wochen.*, February 6, 1888) has used amylene hydrate in sixty-one cases of the most varied affections, and his results are still further confirmatory of the claims already offered as to the value of this hypnotic. He recommends raspberry syrup as the best means for disguising the undoubtedly unpleasant taste of amylene hydrate. Six minims of amylene hydrate and four drachms of syrup made into a dose with water is, he says, well taken by children. It may be given in gelatin-capsules, but to young children better still by pills, since capsules sometimes break in the mouth. Three to 10 drops may be ordered. The doses he has given to adults are about the same as employed by others who have experimented with this drug, varying from 20 minims (the smallest dose) to 2 drachms, which he states that he has administered without any harm following. Almost invariably its administration was followed by the desired sleep; though rarely, before sleep was produced, he observed a stage of excitement and headache. Heaviness and giddiness were sometimes, but not often, noticed afterwards. Like his predecessors, he emphasizes the advantage which amylene hydrate possesses over chloral hydrate in not depressing the heart's action, and it may, therefore, safely be given in sleeplessness connected with diseases affecting the respiratory or circulatory organs.

The only occasion on which this drug appears to have produced the least unfavorable action has been in the hands of Dr. Dietz, who reports his experience in the *Deutsche Med.-Zeit.*, March 1, 1888. Dr. Dietz states that extended use of this new hypnotic has been made in the Leipsic clinic, and calls attention to the fact that for the disguising of the taste of this remedy more syrup must be employed than is usually advised; and as the amylene hydrate, on account of its light specific gravity, mixes with difficulty with other media, it must on every occasion before being administered be well shaken. The importance of this caution is illustrated in the report which he publishes of four cases, where he states that only a moment before administering the remedy to four cases the bottle was allowed to stand at rest. Even during these few minutes enough time elapsed to enable the amylene hydrate to separate from its solvent, and as it collected on the top, a much larger dose than was intended was given. The result was that all four of the patients, who had been extremely restless, now slept throughout the entire night, and on the following morning could not be aroused. The extremities were paralyzed; sensibility, reflexes, and even the corneal reflex entirely absent; the pupils widely dilated; the pulse small and slow, 56 to 60; the temperature reduced to 94° F. Towards the middle of the day two of the patients became somewhat restless, but if raised up in bed at once fell backwards and again fell asleep. For the following night, also, the patients, who had been almost unable to swallow, slept the entire night through, and it was only on the following day that the condition previous to the administration of the drug was reached. Dr. Dietz thinks from the analysis of the amount of the drug remaining in the bottle that but little, if any, more than the dose intended could have been administered. These cases are the only ones which are on record in which any at all alarming or even uncomfortable results have followed its employment. The testimony as to the value of amylene hydrate as a hypnotic is therefore unanimous, and we are surprised that the drug does not appear to have attracted attention in this country.

In conclusion, we need only say that the only thing at present which should hinder the general use of hydrate of amylene is its high price.

### *ANTIPYRIN AND CARBOLIC ACID.*

THE subcutaneous employment of solutions of antipyrin is becoming more and more general, and various procedures have been proposed to maintain antipyrin in permanently aseptic solutions. Among other substances employed for this desired end is carbolic acid. In certain cases, however, it has been found that on standing but for a short time solutions of antipyrin containing carbolic acid become turbid. This precipitate has been attributed to a reduction in the solubility of the antipyrin, but that this assumption is incorrect has been pointed out by Vulpius (*Pharm. Post*, February 19, 1888), who has shown that this result is due to the formation of a compound of phenol and antipyrin. From a number of experiments which he made in this connection he found that a one-tenth per cent. watery solution of antipyrin was not affected by a five per cent. carbolic acid solution, but that permanent turbidity occurred as soon as stronger solutions of antipyrin were added to five per cent. solutions of carbolic acid, or if larger amounts of a stronger carbolic acid solution were added to small amounts of a weaker antipyrin solution. A six per cent. carbolic acid solution was not affected by double its volume of a one per cent. antipyrin solution, but a milky deposit was formed with a concentrated antipyrin solution, and even a one per cent. carbolic acid solution can be made turbid by one or two minims of a fifty per cent. antipyrin solution. In other words, in a solution containing less than one per cent. of carbolic acid or one-half per cent. antipyrin no precipitate will be formed by the addition of the most concentrated solution of the other body. If a ten per cent. antipyrin solution is mixed with several times its volume of a five per cent. carbolic acid solution, and allowed to stand overnight, in the morning a thick, oily fluid will have settled to the bottom. If this is warmed to one hundred degrees it will gradually lose in weight, and will finally form soluble crystals. The author attributes these results to the formation of a compound of two equivalents of phenol and one of antipyrin, but as to what this body is, or as to its possible effects, nothing has been proved. It is evident, however, that carbolic acid is entirely unsuited for sterilizing solutions of antipyrin,—at any rate, until the action and further properties of the resulting bodies have been determined.

WE can strongly commend to any of the subscribers to the THERAPEUTIC GAZETTE who desire reading material for their office-tables or leisure hours the *Century Magazine*, and would call especial attention to the series of papers now in course of publication by Mr. George Kennan, upon the Russian system of government, as the most extraordinary contribution to current political and civil history that has been published for a great length of time. It so happened that originally Mr. Kennan was impressed with the fact that the Russian government had been much belied and condemned improperly on account of its treatment of its political prisoners, and had publicly defended the government. Probably on this account, when he applied to the Russian Minister of the Interior for permission to inspect prisons and mines, he was furnished with a circular letter, by the careful use of which and much natural sagacity he was able to visit the prisons, mines, etc., in all portions of Siberia, and to gather from the exiles as well as from the officials and other sources the secret history of Russian politics. With Mr. Kennan went Mr. George Frost, an artist of ability, whose illustrations will, if the cuts we have seen are a criterion, be almost as interesting as the text of these remarkable articles.

## Reports on Therapeutic Progress.

### *THE TREATMENT OF WOUNDS OF THE FEMORAL ARTERY AND VEIN.*

At a recent meeting of the Royal Medical and Chirurgical Society of London, MR. W. J. WALSHAM read a paper on a case of wound of the femoral artery and vein with traumatic and varicose aneurism with ligature of both artery and vein, which was followed by recovery, of which the following is an abstract (*Lancet*, March 31, 1888):

R. H. W., aged 19, a medical student, received a punctured wound in the upper third of the left thigh. The profuse hemorrhage that resulted was controlled by digital pressure and a firm bandage. On the following afternoon an arterio-venous aneurism was detected. Three days later, as the tumor was increasing, it was explored. The femoral artery and vein in Hunter's canal were found wounded, and were tied above and below at the injured spot. The patient made an uninterrupted recovery. The question of the treatment of a wounded femoral artery and vein was discussed under the following heads:

1. Immediate simultaneous ligature of the artery and vein. The author gave twelve cases in which immediate ligature was applied. In four, and probably in five, gangrene occurred. It was submitted, however, that, especially as concerns the superficial femoral vessels, the danger of gangrene had been overrated. 2. Continuous pressure without operation. Of thirty-six cases so treated, thirty-five resulted in arterio-venous aneurism. The dangers of treating this affection were commented on. The author concluded that pressure alone could not be recommended, and showed that pressure itself involved the danger of sloughing and secondary hemorrhage. 3. Temporary pressure in order to allow the collateral circulation to become established before resorting to ligature. The danger of gangrene after ligature is reduced to a minimum when the collateral circulation has become established. Grillo (of Naples) tied both vessels in fifteen cases for aneurism without a single bad result. In twenty cases collected by the author gangrene occurred in five only, and in four of these five cases the gangrene was due to other causes. 4. Ligature of the artery and application of pressure to the vein. Cases at St. Bartholomew's Hospital were mentioned in which the vein was pricked in tying the artery. No harm followed where the ligature was withdrawn and the artery tied higher up; but where the artery was tied at the same spot thrombosis and blood-poisoning ensued. In all, the hemorrhage from the vein ceased on tying the artery or on applying pressure to the vein. The author considered that in a wound of the artery and vein there is some risk in tying the artery above and below and leaving the vein untouched, or in trusting to pressure upon it, and that such treatment should only be undertaken when the wound in the vein is very small, and there is a reasonable prospect of the external wound healing by the first intention. 5. The question of the lateral *versus* the circular ligature of veins. In four cases of wounds of large veins observed by the author its use was successful, as it was also in thirteen cases of sixteen collected from other sources. The fatal cases occurred before the days of antiseptic surgery. The following were the conclusions arrived at: 1. That when the femoral artery and vein are involved in a punctured wound of the thigh, the safest course is to apply pressure for a few days in the way described in the above case, in order to allow the collateral circulation to become established, and then to cut down and tie the proximal and distal ends of both the artery and vein. 2. That immediate ligature (*i.e.*, before the collateral channels have had time to enlarge) of both the femoral artery and vein, and especially of the common femoral vessels, is liable to be attended with gangrene, although this risk is probably less than has generally been assumed. 3. That ligature of both vessels when, in consequence of pressure, as of a tumor, the collateral circulation has become established, is attended with much less risk of gangrene. 4. That when the femoral artery and vein are wounded, ligature of the artery and pressure on the vein, if the wound of the latter vessel is a mere puncture, is a safe treatment, provided that the nature of the injury allows of reasonable prospects of the external wound being kept aseptic and uniting by the first intention. 5. That when the wound in the vein is too large to permit of treatment by pressure, the walls may be safely nipped up and a ligature thrown around them without obliterating the calibre of the vessel; but that this procedure should only be resorted to, as in the former case, when there is a reasonable prospect of the wound healing by the first intention. 6. That considering the grave risks of gangrene that attend the sudden obliteration of the common femoral vein, the lateral ligature should in this situation, for all small and moderate-sized wounds that require immediate ligature, be the treatment adopted.

Mr. Hulke had ligatured simultaneously in two cases of cancerous ulceration the external iliac artery and vein without any apparent ill results following. There was a great variety between the aneurismal varix and varicose aneurism; in the former an elastic bandage might also do away with its evil effects. A case was mentioned of a pistol-shot wound, in which the femoral artery and vein were bruised; the necropsy, ten days after the accident, showed that in a little more time the eschar between the lumen of the artery and vein would have given way and led to a direct communication between artery and vein. He had obtained good results in cases of lateral ligature of such veins as the internal jugular and longitudinal sinus.

Mr. Harrison Cripps commented on the difficulty of discovering whether both vessels were injured, and he said he was disappointed with the title of the paper. He remarked on the great value of pressure in the treatment of wounded vessels; but this pressure must be done very systematically and intelligently,

the most effective way being first to bandage the limb, and next to apply compresses above, below, and on the wound, with the pressure so arranged as to be easily shifted on to different parts as required. He did not place much reliance on statistics drawn from published cases.

MR. THOMAS SMITH narrated the case of a boy in which both vessels were wounded, and led to an aneurismal varix, and in which systematic treatment by pressure ended in cure.

MR. PEARCE GOULD narrated the case of a lad under Mr. Lawson's care in which it was found advisable to ligature the artery, and with a very good result. Wounds in the arteries should, he considered, be treated the same way, regardless of the situation of the artery. He did not feel sure of the value of delay, and pointed out some of the evil effects of pressure, making one hesitate about waiting before cutting down and securing both ends of the artery.

MR. WALSHAM, in reply, could not agree with the remarks of Mr. Cripps on pressure, which had been tried in his own case with, he thought, the approval as to method of Mr. Cripps. He agreed with Mr. Gould that if there was much extravasation into the tissues Guthrie's rule should be followed, but not otherwise. No harm could result from waiting a few days and trying pressure.

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### *THE PRACTICAL APPLICATION OF GLYCERIN.*

At a meeting of the St. Louis Medical Society, held March 3, 1888, DR. J. N. LOVE read a paper on "The Practical Application of Glycerin" (*Journ. of the Amer. Med. Assoc.*, April 14, 1888). There is no one disturbance that, superficially viewed, seems so trivial, and yet which may be the cause, directly or indirectly, of such positive injury to the human anatomy as constipation. In infantile life, and during all ages, particularly among women, it is a prevalent disorder. The number of cases of hemorrhoids, prolapse of the rectum, fissure and fistula of the anus, not to speak of the cases of fever due to absorption of ptomaines, all traceable to constipation, cannot be computed. Any procedure that promises relief for this dire disturbance should be thoroughly tested and, if efficacious, adopted.

In the *British Medical Journal* of December 24, 1887, Dr. Julius Althaus reports, with the endorsement of his own experience, a procedure recommended by Anacker for the relief of habitual constipation,—viz., the injection by means of a small glass or hard rubber syringe of a teaspoonful of glycerin into the rectum. An evacuation of the bowels usually occurs immediately or within a few minutes.

The *rationale* of its action given by Anacker is that glycerin, in consequence of its pronounced affinity for water, when placed within the rectum, abstracts moisture from it, causing hyperæmia and irritation of the sentient nerves of the rectum, which leads reflexly to active and prompt peristaltic contractions, ending in defecation. The greater the accumulation of fæcal matter in the rectum the more decided the effect. There is no unpleasantness or pain, but the action takes place *cito, tute et jucunde.* Sometimes a little fulness and throbbing is felt in the rectum for a few minutes afterwards.

Althaus expressed the opinion that this plan, on account of its simplicity and readiness, would be found to constitute a veritable improvement in the therapeutics of constipation. The writer has applied it many times daily where the conditions suggested it, and no matter what the age, or degree of constipation, the response has been uniform and prompt. In a large number of infants and mothers where habitual constipation had been present from the birth of the former the remedy produced instantaneous relief, and coupled with broken doses of the mild chloride to stimulate the secretory system, it furnishes a key to unlock the constipated condition which can be depended upon. The author directed the use of the glycerin injection at a definite hour each day, and has succeeded in establishing regularity in almost every instance.

There is no question about the securement of an evacuation almost immediately after the glycerin injection. The main point, in order to obtain a result that will be lasting in character, is to impress the patient or attendant with the importance of giving the injection at a certain time each day. In a few cases of piles and severe rectal irritation accompanying constipation, both conditions were more satisfactorily relieved by the glycerin than they had been previously by purgatives and sedative ointments. This remedy is a valuable one in being efficient, simple, and convenient. It is surprising that some one had not thought of and applied it before.

Apropos to this subject, Dr. Edward R. Mayer, of Wilkesbarre, Pa., reports in the *Medical News* of February 25 the use of an injection of 2 fluidounces of warmed glycerin through a large flexible rectal tube, inserted

at least seven inches, for the relief of intestinal obstruction due to paralysis of the muscular coat of the bowel, superinduced and accompanied by peritonitis. All other means for securing an evacuation of the bowel having failed, Dr. Mayer having been uniformly successful in the application of the Anacker-Althaus plan of using glycerin, it suddenly occurred to him to extend and amplify the method as above stated. The insertion and the injection produced no distress or immediate effect, and he left the invalid with directions to her nurse to cause the hips and knees to be elevated for a time. Upon his return, after several hours, he found a greatly changed condition of affairs,—comfort where there had been agony, and an anxious and pallid countenance replaced by beaming smiles and hopeful expressions.

He was informed that within ten minutes after the administration of the glycerin enema the patient felt a warm thrill and glow extending itself and permeating all through her intestines, followed by the vermicular movements which precede peristalsis, by audible sensible displacements of gas, and, finally, by acute colicky pains. Within twenty minutes after the injection there was an urgent call to stool, with the result of the escape of a large amount of flatus, and later, of a pint of semi-liquid evacuations of mingled yellow and green color, with some small scybalæ and a very pronounced odor. This evacuation was succeeded in an hour by another of a similar character. Considerable tympanitis and tenderness still existed, but the abdominal distention was decidedly reduced, and the distress greatly relieved. The temperature, which had been kept depressed to about 100° by the antipyrin, soon fell to 99°, and the thready, jerking pulse of 120 had descended to 100, and the next day was not above 90, becoming rapidly soft and full. The nausea abated, and in a few hours disappeared and did not return.

Enemata of warmed glycerin to the extent of 2 ounces each were now administered night and morning during the next three days, each one resulting in a copious fæcal evacuation, at first liquid and then formed. The temperature varied during several days between 99° and 99.6°, the pulse soon dropped to 80, the tenderness gradually disappeared, and the distention slowly melted away. Milk-punch, beef-tea, and revalenta Arabica were greedily taken in small quantities, retained, and digested, and upon the ninth day of the illness the patient, while feeble, was entirely convalescent, a salutary diarrhœa having set in after the enemata were discontinued, and soon ceasing. The only drug treatment employed after the symptoms improved was a single very small dose of a saline laxative, and a nightly hypodermic of 6 minims of morphine solution to secure rest.

The result in this case was extremely satisfactory, and very important in its suggestion of possibilities.

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### *TREATMENT OF GONORRHŒA BY ANTROPHORES.*

Dr. Hugo Lohnstein, of Professor Zuelzer's polyclinic in Berlin, has found, as the result of observations on ninety-three cases, that gonorrhœa, both in its acute and chronic form, usually yields more readily to systematic treatment by a kind of medicated soluble bougies called *antrophores* than to other methods. These antrophores are made by Herr Stephan, a pharmacist in Treuen, Saxony, and consist of a nickel-plated metallic spiral containing a soft medicated material, the basis of which is gelatin and glycerin,—the same kind of thing, in fact, as the hektograph and other "graph" compositions are made of. Before the introduction of the bougie the urethra is well syringed out by a Zuelzer's apparatus with a two per cent. solution of boracic acid. Regarding this Dr. Lohnstein remarks that the mere passing of urine by the patient is quite insufficient to cleanse the passage from secretion, as any one may easily convince himself by an examination with the endoscope. As a rule, a single bougie is sufficient during twenty-four hours. Indeed, when the introduction was repeated several times a day no better result was obtained, but, on the contrary, the urethra appeared to be irritated by the instrument. These bougies must be differently applied in acute and chronic cases. In an acute gonorrhœa, where the prostatic portion of the urethra is not affected, the bougie should not be introduced into it, the surgeon being able to tell when the prostate is reached by the greater resistance caused by the circular muscular fibres. In chronic gleet, where the prostatic portion is affected, the bougie should be made to enter it, but ought always to be kept from entering the bladder, which may bring on strangury and even cystitis. The surgeon guards against this by asking the patient to tell him when he feels as if the instrument were in the bowel. He then knows that it is in the prostatic portion. The medicament mostly used by Dr. Lohnstein is thallin. For

the first and second days bougies containing two per cent. of this substance are employed; even, this strength occasionally produces a sensation of burning. On the third and subsequent days a bougie with five per cent. of thallin can usually be borne. It is not found advisable to allow patients to introduce the bougies themselves, for they are liable to set up hemorrhage and to push the instrument into the bladder. In an acute case the thick secretion is usually changed by the second or third day into a thinner and clearer fluid; during the next few days the quantity of this gradually diminishes, and the secretion has generally entirely ceased in from eight to fourteen days' treatment. Complications such as are produced by injections very rarely occurred; epididymitis never; cystitis in two cases only, and in these it was probably due to faulty introduction of the bougies. Several cases were cured that had resisted other measures. The most difficult class of cases to treat is, of course, the chronic form. Here it was often found that, though the secretion could be greatly reduced, any attempt to lengthen the intervals of the introduction of the bougies was liable to be followed by a return to the original condition. Where the prostate and its ejaculatory ducts are affected, it is often necessary to have recourse to bougies of different kinds,—*e.g.*, zinc, tannin, rhatany, nitrate of silver, quinine, or sulphoichthyolate of ammonium. Of course, where, instead of the mucous membrane generally being inflamed, there is a small ulcerated patch, these bougies are useless, and the endoscope must be employed as a guide to special local treatment.—*Lancet*, March 24, 1888.

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### *THYME IN THE TREATMENT OF WHOOPING-COUGH.*

The last remedy added to the extensive list of drugs in the treatment of whooping-cough is common thyme, a decoction of which Dr. J. B. Johnson states, in the *Med. and Surg. Reporter*, March 17, 1888, will prove highly satisfactory. He writes that the simplicity of its preparation, its mildness of action, and peculiar sedative and antispasmodic effect in controlling the violence of paroxysms is most astonishing. The little sufferers take the decoction without the slightest hesitation, and the benefit they derive from it is as prompt as it is remarkable. It is claimed to reduce the paroxysmal character of the cough, and renders the disease milder in its force and shorter in its duration. Dr. Johnson directs an ounce of common thyme to be put into one pint and a half of hot water, and boiled down to one pint, then strained, and sweetened well with either honey or sugar. Of this 1 or 2 teaspoonfuls are given regularly every hour or two to infants, and to children a tablespoonful every hour or two during the continuance of the disease. If there is much inflammatory action of the bronchial tubes or lungs, he adds two drachms each of iodide of potassium and powdered chlorate of potassium to each pint of the sweetened decoction, and directs it to be used in the same manner as the simple decoction.

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### *GASTROSUCCORRHŒA.*

Reichmann was the first writer who described a case of increased secretion of the stomach (1882). Recently he has added further experiences to his opinions concerning the pathology and therapy of the functional disturbance. He recognizes two varieties of the disease,—the periodic and the continuous gastrosuccorrhœa.

The periodical attacks may take place when the stomach is empty or when it contains a small amount of nourishment. The complaint is most common to nervous individuals. The cause is most likely due to a functional disturbance of those nerves which control the secretions of the glands of the stomach.

The attack occurs without warning, and is followed by secondary symptoms, the most important of which is vomiting. It is easily observed that the amount vomited by the patient at once, or in short intervals, greatly exceeds the amount of fluid which had been taken into the stomach. This proves that there has been an increased secretion of gastric juices. The acidity of the vomit is also less than normal, ranging from .8 to .4 per cent. The vomiting is caused by an irritation of the mucous membrane of the stomach due to accumulation of gastric juices. Further symptoms are heartburn, thirst, and headache. The general system suffers considerably.

The duration of a single attack is not usually longer than twenty-four hours, although, at least in hysterical patients, it sometimes lasts for days, weeks, and even months. During the attacks the author prescribes narcotics. Good results have also been observed to follow the use of 1 grain to

1½ grains of nitrate of silver. Also a treatment calculated to relieve the nerves must be practised.

In continuous gastrosuccorrhœa the case is different. Here not only a functional nervous disturbance exists, but added to it is also an increased irritability of the secretory apparatus and a disturbance of the mechanism of the stomach. The increased irritability does not alone depend upon the juices secreted by the stomach when food is present, but because the secretion continues even after the stomach is empty, and gradually becomes continuous.

Such an accumulation of gastric juices can, however, only occur when also a motoric disturbance exists simultaneously. Therefore *atony* of the muscular apparatus always exists, and in more advanced cases *ectasy* of the stomach. The acidity of the stomach in most cases was found to be increased. The general symptoms, as described by Riegel, are increased appetite, constant thirst, heartburn, pain, vomiting, constipation, general digestive disturbances, such as anæmia and loss of flesh. To be positive in the diagnosis it is necessary in every case to rinse the stomach well out in the evening, and pump out all the water, and not to give the patient anything to drink for the entire night, then in the morning remove the contents of the stomach, and ascertain with certainty whether it is pure gastric juice or mixed with gall and mucus.—*Medicinisch - Chirurgische Rundschau*, February 15, 1888.

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### *ARTERIAL PRESSURE IN BRIGHT'S DISEASE.*

At the meeting of the Medical Society of London, March 5, 1888, Dr. Broadbent read a paper on the prognostic significance of the blood-pressure in acute renal disease (*Lancet*, March 10, 1888). He said that though high arterial tension was present in almost every form of kidney-disease, yet he had twice seen low tension when symptoms of renal cirrhosis were present. In acute renal dropsy, when the pulse-beats were short and easily arrested, it indicated temporary dilatation and weakness of the left ventricle; from this the heart afterwards recovered. A continued defect of tension might be due to persistent cardiac weakness, and in this latter was of unfavorable prognostic import; in other cases it indicated diminished peripheral resistance, and this also was of bad augury. He quoted the case of a carman, of sober and steady habits, who was admitted into St. Mary's Hospital with acute renal dropsy of four days' duration. His mother had been of intemperate habits, and he had undergone privation two years previously, but no exciting cause of the attack could be found. He had swelling of the face, scrotum, and extremities, a bad cough, and solid, albuminous urine, containing epithelium and casts. The temperature was subnormal; the pulse 64, short, and weak. The first cardiac sound was short, the second weak, and there was extension downwards of dulness. Dr. Broadbent pointed out that the most certain cause of albuminuria was the languid movement of blood in the renal capillaries, and the indication here was to improve the circulation. Under a mixture of iron, sulphate of magnesium, nux vomica, and digitalis the dropsy diminished, the pulse became of better volume and not so compressible, and the albumen diminished to a little more than a trace. The patient was allowed to get up too early, and this brought about a temporary increase in the albuminuria. The imperfect development of blood-pressure showed the nature of the patient's constitution, and might be made use of in prognosis. It indicated a long illness and the necessity of the use of vascular stimulants.

Dr. Maguire said that Dr. Broadbent, by drawing attention from the renal condition to the circulatory system, had led the way to rational treatment. He had found cases of high tension best relieved by calomel and salines, those of low tension by nux vomica and iron.

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### *HELLEBORUS VIRIDIS.*

The fluid extract of helleborus viridis has a yellow color, a sharp, bitter taste, and an average specific weight of 1.097.

Dr. Christovich, says the *Revista de Ciencias Mèdicas de Barcelona*, having first made thirty-six experiments with the drug upon dogs and frogs, tried the remedy in eleven cases of cardiac disease, with the following results:

1. The drug increases the heart's contractions, strengthens its action, and increases the fulness of the pulse.

2. A decrease of the heart's activity was noticed in cases of violent cardiac activity.

3. Congestions of the lungs, liver, and kidneys were either cured or improved by the drug.

4. The secretion of urine was increased.

5. Transudations in different parts of the

body were relieved by the extract, and the weight of the body decreased on account of the elimination of water.

The dose employed was 10 to 20 drops of a one per cent. solution of the extract given four to six times daily.—*Deutsche Medizinal-Zeitung*, Berlin, January 30, 1888.

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### *INTRA-TRACHEAL SPRAY.*

Dr. A. F. Modestoff has published as a graduation dissertation an account of some investigations made by him in Professor Sushchinski's laboratory in St. Petersburg on the administration of powerful drugs to dogs by means of spraying into the lungs from the trachea. The instrument used was something like a hypodermic syringe needle with a lateral orifice; this needle was connected with a small spray apparatus, the reservoir being in the form of a test-tube, and graduated so as to show how much of the liquid had been used. As, of course, it was difficult to prevent the animal's struggles from interfering with the operation, it was found advisable, after shaving the front of the neck, to expose the larynx and to fix it. The needle was then inserted into the trachea so that the orifice should look downwards. When water or indifferent solutions were used no effect was produced on the respiration or blood-pressure which was taken in the femoral artery. When, however, solutions of active drugs—such as curare, strychnine, cocaine, and atropine—were employed, a very prompt effect was produced, frequently in about ten seconds. It was found, too, that the effect was greater as well as more prompt than when the same doses were administered by the mouth, the rectum, subcutaneous injection, or even than when introduced into the venous circulation. Of course, Dr. Modestoff does not propose that under ordinary circumstances this method of administering medicine should be adopted for human beings, but he thinks that it may possibly be advantageous where prompt action is of the last importance,—as, for example, in some cases of poisoning, and in hæmoptysis, where other methods of treatment have failed. He quotes, also, the experience of Jousset, who, as long ago as 1874, saved the lives of two patients suffering from a very grave form of malarial fever by injecting a solution of quinine into the trachea. He also suggests that in cholera the physiological solution of chloride of sodium might be employed in this way. Again, in cases of disease of the respiratory passages where tracheotomy is indicated, he thinks that perhaps the intra-tracheal spray might sometimes serve. One observation was made on a human patient, a man on whom tracheotomy had been performed for Stoerck's blennorrhœa. A single spraying of a fluid-ounce of the physiological solution of chloride of sodium, at a temperature of 60° C. (which previous experiments had shown to give a spray of about 38.5°, or a little above the temperature of the healthy body), was sufficient to cause a quantity of inspissated crusts to be coughed up, with the result of making the patient feel very much relieved. The spray was repeated several times, causing no inconvenience or unpleasant symptom. An interesting table is given by Dr. Modestoff, showing the change of temperature caused by the formation of spray. Thus the temperature of the room being 20° C., that represented the only temperature for the liquid which underwent no change, or at which the temperature of the spray was one hundred per cent. of that of the liquid in the reservoir. When the liquid was 15° C., the spray was at the first half-minute 17°, at the second 18.5°, and at the third 18.5°, the maximum percentage of the original temperature shown by the spray being one hundred and twenty-three. Of course, when the liquid was warmer than the air the process of atomization cooled it, so that a liquid of 40° C. gave a spray of 32° during the first half-minute, and of 31° during the second and third half-minutes,—*i.e.*, it was cooled to eighty per cent. of the original temperature; while a liquid of 90° C. fell to 50.5°,—*i.e.*, to fifty-seven per cent. This shows that care must be taken to ascertain the effect of the process of atomization on the temperature of the liquid before arranging the details of the operation.—*Lancet*, March 17, 1888.

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### *CONIINE BROMIDE IN TRAUMATIC TETANUS.*

Under the influence of bromide of coniine, a case of traumatic tetanus was greatly relieved, indeed conquered, for after thirty-four hours of treatment the symptoms disappeared entirely. The drug relieved the pitiful condition of the patient in a truly wonderful manner. Still, its use had to be accompanied with extreme caution, as its paralyzing effect upon the respiratory muscles is well known, and therefore its administration should only be attempted where the patient can have unceasing medical attention.

The dose advisable, says the *Wiener Medicinische Blätter* for January, 1888, is .005 to .01 gramme ($\frac{1}{12}$ to $\frac{1}{6}$ grain) for children, and from .01 to .025 gramme ($\frac{1}{6}$ to $\frac{1}{3}$ grain) for adults. This dose should be given hourly, but discontinued the moment any symptoms of respiratory paralysis are observed. This may be recognized when the breathing becomes shallow, irregular, and more frequent. The immediate application of artificial respiration seems to be the best method in checking the approach of this respiratory paralysis.

Traumatic tetanus, which may be regarded as the result of the infection of poison through a wound, has indeed been relieved by a few remedies, among which we may mention *curare*, but in a few days has always resulted in the death of the patient. In cases of moderate tetanus, where the paroxysms do not follow each other with any great rapidity, bromide of coniine may be regarded as a *curative* means, and thus gain an imperishable reputation in therapeutics.

The case in question which substantiates the above assertion was, as reported by Demme, as follows: A boy, aged 11, while bathing in the river Aar, ran a piece of glass into his foot. The fragment was easily extracted and the wound healed in the course of a few days, and only a small discharging opening remained. On the fourth day, while an iodoform bandage was being applied, it was noticed that there was a slight spasmodic contraction of the lower extremities. Three hours later there was a general tetanic convulsion of the whole body. Demme immediately injected $\frac{1}{6}$ grain of bromide of coniine hypodermically, and ordered $\frac{1}{12}$ grain of the drug to be given internally every two hours. In this way over a grain of coniine was given in twenty-four hours. The tetanic symptoms did not reappear. The next day the boy was given four $\frac{1}{12}$-grain doses of the drug. In a week after admittance the boy was discharged as cured.

In this case no toxic effects were observed to follow the use of the bromide of coniine. For several days the boy complained of great weakness of the legs.

In experiments upon animals, it was observed that when given during the first symptoms of tetanus, coniine always acted with promptness and efficacy.

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### *ASPARAGUS IN METRORRHAGIA.*

At a meeting of the Don (Novotcherkask) Medical Society, Dr. A. A. Aksuetĭna, a local lady-doctor, showed (*Proceedings of the Don Medical Society for* 1885–86, p. 17) the herb of a wild *Asparagus officinalis* (Russ. *sparja*,—most likely derived from the English "sparage"), which is used in Russian popular medicine as a means for arresting flooding. She narrated also a case from her own practice where the drug had been employed with good results. In a multipara, who had missed her menses once, there suddenly appeared metrorrhagia of a moderate intensity, which did not yield to the treatment by cold-water injections and absolute rest. By the end of two and a half weeks the patient, following the suggestion of a friend of hers, resorted to an infusion of asparagus, made of a handful of the herb to two teaspoonfuls of boiling water, one cupful of the infusion to be taken in the morning and another in the evening. The bleeding gradually ceased before night came, and on the next morning a four-weeks' fœtus, in a semi-putrid state, was expelled. Dr. Aksuetĭna thinks that asparagus caused an energetic contraction of formerly atonic uterine muscular fibres, and thus enabled the womb to complete separation of an already semi-detached ovum.—*Lond. Med. Rec.*, January 20, 1888.

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### *DIMETHYLETHYL-CARBINOL.*

Dimethylethyl is obtained by the action of chlor-propionyl upon zinc methyl. In a pure state it is a transparent, oily, sharply-smelling liquid, which boils at 102.5° C. and melts at 12° C. Oxidation results in the production of acetic acid and propionic acid.

Experiments with the drug gave the following results:

1. In frogs .001 to .005 ($\frac{1}{64}$ to $\frac{1}{12}$ grain) injected hypodermically acted much more powerfully than trimethyl carbinol.

2. In consequence of paralysis of the vasomotoric centres the pressure of blood is considerably lessened.

3. The bodily temperature is greatly decreased.

4. While the primary alcohols irritate the brain and are therefore regarded as stimulants, the tertiary alcohols act as depressants. Dimethylethyl-carbinol belongs to this class. It must, however, be mentioned that the tertiary alcohols are as yet but slightly known, and it seems that their actions are very different.

The above is a preparatory statement of Dr. Boris Schapirow, of St. Petersburg. The author is actively engaged in investigating this drug, and will shortly publish an article upon the result of his researches.—*Pharmaceutische Post*, January 1, 1888.

*HYDROCHINON.*

The importance of hydrochinon lies in the rapidity with which it acts. Its value, however, is lessened by the comparatively short duration of its action. The higher the temperature is the more pronounced is its action. In certain infectious diseases, especially in ileo-typhus, acute articular rheumatism, and erysipelas, the drug is most valuable, and seldom fails to act with wonderful promptness and efficacy. It is of much less value in pneumonia and tuberculosis, and is absolutely worthless in malarial fever. Its action is not limited to a reduction of temperature, but its influences extend to the pulse, respiration, and secretion of urine, arterial pressure and diaphoresis. A noteworthy feature is that the drug does not produce any of the above-mentioned symptoms upon a healthy man or upon animals.

It acts best when given in moderate doses (5 to 8 grains hourly for an adult); larger doses are liable to cause gastro-intestinal troubles, which, when they once have taken place, completely check the absorption of the drug.

In existing affections of the intestinal tract, which have an infectious origin, hydrochinon acts most beneficially; this is most probably due to its "antifermentative" and antiseptic properties. The drug is quickly eliminated by the urine as "chin-hydron," which colors the urine a dark green.—*Med.-Chir. Rundschau*, February 15, 1888.

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*THE TREATMENT OF EXTRA-UTERINE GESTATION.*

If one were guided by what is to be found in the text-books of gynæcology, it would be supposed that the difficulty of dealing with the condition of ectopic pregnancy lay rather in the treatment than in the diagnosis, the latter being based apparently on the recognition of certain quasi-pathognomonic signs and symptoms. It will be a shock to practitioners who have not already had the fact brought home to them by inglorious experience that, as a matter of fact, the diagnosis of an uninflamed and non-ruptured extra-uterine fœtation during the early months is difficult and even impracticable. Symptoms of a kind to excite suspicion are often entirely wanting, and, if present, are likely to be attributed to other and far commoner pelvic diseases. Mr. Tait stated the other day that in all his experience he had only seen one such case prior to rupture, and then he had signally failed to arrive at a correct diagnosis. Of course, gynæcologists do, now and again, make a correct guess,—for it is little more,—and find their forecasts justified by the results of operative interference; but, short of the fœtal heart, it seems pretty certain that no means are available for detecting the existence of extra-uterine pregnancy with assurance.

We will, however, assume for the moment that, though difficult, the diagnosis is practicable, and that brings us to the question of treatment. As treatment has for its object to prevent the otherwise inevitable rupture of the sac, it may be well, in the first instance, to inquire into the circumstances which determine this disastrous occurrence. Now, we have it on the authority of several eminent gynæcologists that when operative interference is rendered necessary by rupture of the sac before the fourth or fifth month, the fœtus is generally macerated, and it is, therefore, inferred that the death of the fœtus preceded the rupture. When, in the course of a normal pregnancy, the fœtus dies, expulsive efforts, as a rule, soon follow, and, assuming an analogous condition of things to apply to the Fallopian tubes, the muscular coats of which undergo considerable development when they contain a fœtus, it is not unreasonable to suppose that the death of the fœtus in ectopic pregnancy is, in many cases, the proximate cause of the rupture. Expulsive efforts are made, and as the contents of the tube cannot pass into the uterus, the coats yield, and rupture takes place. This has an extremely important bearing, for, if the inference be correct, the treatment usually advocated of arresting the growth of the fœtus by killing it is about as wrong as it could be. Further, it is by no means certain that by killing the fœtus we arrest the growth of the placenta, which may go on growing, and has done so in a certain number of cases, as the specimens show.

The recently-introduced method of destroying the fœtus by the passage of an electric current is, then, open to a variety of criticisms. Its advocates claim to have been successful, in upwards of twenty cases, in arresting growth and averting serious consequences. They urge that objections based upon the probable result of killing the fœtus, and the continued and unhindered growth of the placenta, are idle, inasmuch as no such complications have ever caused them to regret their interference. Here, however, the question of diagnosis comes in, and they are told that

their immunity from any of these sequelæ has been due simply to the fact that no reliable evidence is forthcoming of the cases having been really cases of extra-uterine fœtation, and, as we have already observed, since no evidence short of the fœtal heart-sounds can be accepted as conclusive, the success of the treatment remains open to question.

What, then, is the proper and rational treatment of these cases in the eyes of those who condemn early intervention on both diagnostic and technical grounds? Mr. Tait says that the life of the child is an element which ought to command attention. As you are unable to diagnose the condition in its initial stage, he says, let it alone until you can,—that is, until the fœtal heart places your diagnosis beyond question. But then more than ever the murder of the child would be inadmissible, for its death would in all probability subject the mother to an additional danger, and one life would be destroyed without any corresponding benefit for the other. Once the fœtal heart-sounds have been detected, then the best course is to leave matters severely alone, enjoining only on the patient certain precautions as to the avoidance of exertion, etc. Should rupture occur, or at any moment that may be deemed most conducive to the interests of both mother and child, laparotomy may be performed, and the lives of both in the majority of cases preserved. The logic of these arguments is irrefragable; but, inasmuch as sundry of the premises are, after all, matters of conjecture, it would be becoming to show some reserve before accepting the conclusions.—*Lond. Med. Rec.*, February 20, 1888.

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*HYPERPYREXIA TREATED BY COLD.*

At a meeting of the Clinical Society of London, held March 23, Dr. Wm. M. Ord read a paper on a case of hyperpyrexia in acute rheumatism treated by the ice-pack (*Lancet*, March 31, 1888). The patient was a man, aged 32, a heavy beer-drinker, who had contracted, three weeks before admission to St. Thomas's Hospital, a sharp attack of acute rheumatism, referred to exposure to cold. On admission, he was found to have acute inflammation of many joints, marked signs of pericarditis, and slighter signs of endocarditis, with some pleurisy. His temperature was 102.4°; the respirations were quickened; the urine contained one-sixth of albumen and very little chloride. He was slightly delirious. Two days later the delirium had increased to such a degree that it was necessary to remove him from the large ward to a single-bedded ward. He was very violent, had hallucinations and delusions, and was with difficulty kept in bed. The delirium strongly suggested the existence of hyperpyrexia, but the temperature was only 101.4°. After this the temperature rose steadily, till at 4 A.M. on the morning of the fourth day from admission it reached 108.4°, while the patient had fallen into a state of restless unconsciousness, with tremors. The ice-pack was now applied, and was maintained for four hours, at the end of which the temperature was 100°, the patient had recovered consciousness and spoke sensibly, and the pulse had fallen from 160 to 100. During the next few days the temperature, after a rise to 103.4°, kept between 100° and 101°. The signs of pericarditis disappeared, but those of endocarditis remained. The joint affection had greatly decreased, and the albumen had disappeared from the urine. On the seventh day after admission the temperature again began to rise, and at 2 P.M. on the morning of the eighth day was 105.4°, the patient having passed through delirium into restless unconsciousness. The ice-pack was again applied. At 5 A.M. the temperature was 100°, and the patient had recovered consciousness. After this the patient made a steady recovery, and was discharged six weeks after admission in good general health and without sign of lung- or heart-disease. The treatment was effectively carried out by Dr. Ord's house physicians, Dr. Wheaton and Mr. Macevoy. Dr. Ord brought the case before the Clinical Society, not because it presented anything new or original, but with the intention of emphasizing the value of cold applications to the surface of the body in hyperpyrexia. He urged that, notwithstanding the acknowledged value of the various antipyretic drugs in pyrexia, their use in hyperpyrexia was comparatively unsafe, large and frequent doses being required, whereby toxic symptoms were often produced. He admitted that the bath treatment was not of universal applicability, but pointed out that it involved no poisoning, and had a remarkable effect, not only in reducing temperature, but in restoring the nervous system to a natural condition. The rapid disappearance of inflammation in the thoracic viscera and joints was also noteworthy.

Dr. C. J. Arkle read notes of two cases of hyperpyrexia successfully treated by cold.

The first case was that of a railway clerk, aged 27, married, who was admitted into University College Hospital on September 21, 1887, with an ordinary attack of rheumatism. Previous health and habits good. Had syphilis nine years ago. His mother died after an attack of acute rheumatism. His sister was rheumatic. On admission he was treated with large doses of salicylate of sodium. The night after admission he became very delirious, the joint pain disappeared, the skin was hot and burning, and the temperature went up to 110.4°. After employing the ice-cold bath for forty minutes the temperature fell to 97°, but ran up four hours later to 107.2°, while taking antifebrin. The bath was repeated for twenty-five minutes, after which the temperature fell again, and showed no further tendency to run up excessively. There was no visceral lesion. The patient was ultimately discharged cured.

The second case was that of a married woman, aged 30. She had rheumatic fever eighteen years ago; no complications. There was no family history of rheumatism. Had been ailing with joint pain for a week before she was seen by a medical man. Temperature at mid-day on October 9, 1887, was 102.5°, at 10.30 the same night 110.4°. Patient violent and delirious. No bath was available, so she was treated with ice-cold packs. The temperature fell in one hour later to 101°. For the next twenty-four hours it averaged 103°; then fell to normal under salol and salicylate of sodium. Was discharged well on October 27. She was readmitted with another attack of acute rheumatism and pericarditis, but was now convalescing.

Dr. Arkle said that these cases show the value of the cold bath and pack as antipyretics. Both belong to the type in which the temperature, after maintaining for one or two days a moderate level, suddenly rises to an excessive height. In both cases the temperature was very tractable, and had little tendency to run up repeatedly. The cases threw no light on the etiology. One was a male and the other a female; one a first attack and the other a second. Both seemed mild, uncomplicated attacks. In both there was cessation of sweating, and in one disappearance of articular pain. In both the delirium accompanied the hyperpyrexia, and was of the same violent character. Both patients had marked retraction of the head, and one severe or persistent opisthotonos.

Dr. Maclagan concurred in the treatment. As to the physiology and pathology of the hyperpyrexia, he argued that the metabolism of the tissues was interfered with through the nervous system, there being a kind of paralysis of the inhibition which normally kept the tissue-changes within bounds. He drew a distinction between the pyrexia and hyperpyrexia, especially in rheumatic fever. The resistance or inhibition of the heat-centres being removed, hyperpyrexia resulted, and this was, therefore, of nervous origin, and afforded the reason for salicylates being useless in true hyperpyrexia. Cold increased the inhibition of the heat-centres, and did not act simply mechanically or physically. Cold acted on the heat inhibitory centres pretty much in the same way as digitalis did on the cardiac nervous centres. Cold, therefore, not only relieves the fever, but cures the nervous cause of the fever.

Dr. Coupland thought that the distinction between pyrexia and hyperpyrexia was hardly justified; for pyrexia is due as much to nervous derangement as hyperpyrexia, and in both cold acted as a remedial agent. He called attention to the marked nervous symptoms which heralded the rise of hyperpyrexia in Dr. Ord's case. Prodromal symptoms were very generally observed.

Dr. Broadbent considered that the delirium and coma were not due merely to the high temperature, but were rather to be partly attributed to nerve disturbance of the same order as caused the hyperpyrexia. In relapsing fever nervous symptoms were sometimes observed preceding and accompanying great rises of temperature. He had observed in rheumatic cases delirium of the hyperpyretic type, but hyperpyrexia did not occur always. Both cases were treated by salicylates, and both ended fatally. Besides the abstraction of heat, an impression was made on the nervous system by the cold, and this enabled the heat-centres to resume control over the heat-producing processes.

Dr. Basil G. Morison mentioned the case of an infant 14 days old, whose pulse, consequent on over-feeding, fell to 30 per minute, the skin becoming cold. A drachm of tincture of belladonna was injected into the rectum, whereupon the pulse rose to 180 and the temperature to 103°. The child's life appeared to be in danger. Ice was applied, and the pulse and fever fell. The heart stopped for a few beats. The child recovered. As an illustration of the action of cold, the case was thought to be interesting.

DR. ANGEL MONEY said that the expression used by the patient in Dr. Arkle's first case afforded an illustration of the principle of dissolution as expounded by Hughlings Jackson.

DR. BARLOW described a method he had practised of employing cold water, which chiefly consisted in pouring water from a height on to the patient lying in bed inclined downwards from the head, a mackintosh being arranged to carry the water off into a vessel at the foot of the bed. He had treated cases successfully on this plan, which could easily be carried out at the patient's home, and made the friends less timid than did the employment of the whole bath.

DR. ORD, in reply, pointed out that Dr. Maclagan's theory of hyperpyrexia being due to paralysis of the heat inhibitory apparatus was supported to some extent by Dr. Buzzard's views as to rheumatic fever being due to an affection of the medulla, in which the heat-centre was supposed to be located. He argued that the effect of the cold was not merely mechanical, and recalled some experiments which he made a year ago on the effect of cold baths on the dead. He had found that a bath which in the living would bring down the temperature several degrees had very little effect on the dead body. He considered that although the mechanism of the production of pyrexia and hyperpyrexia might be the same, the same stimulus which in one man would cause a normal reaction (fever) gave rise in another to an exaggerated reaction (hyperpyrexia). He advocated recourse to preventive measures wherever the temperature exceeded 105°. He added that he attributed the delirium accompanying pericarditis not to this affection, but to the effect of a rising temperature. He preferred the graduated bath as less uncomfortable and less dangerous.

DR. ARKLE, in reply, said that information was wanting with reference to prodromal symptoms in his two cases, especially the latter.

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### *BITTER ACID OF HOPS.*

In 1860, Lermer discovered a crystalline bitter substance in hops, to which he gave the name of bitter acid of hops ("Hopfenbittersäure"). This substance has only recently been rediscovered or rather reformed by BUNGENER while extracting lupuline and legroine.

It is a very unstable body, and when left exposed to the air hardens into a yellow resinous mass, whereby also a non-crystalline, bitter substance is formed, which is soluble in water. The acid is poisonous, but the amorphous, bitter substance, which is found also in beer, is not poisonous.

The acid was dissolved in alcohol, and by an addition of a solution of soda the sodium salt of the acid was formed. This was soluble in water, and with it Bungener experimented upon animals. Doses of 2 milligrammes ($\frac{1}{32}$ grain), when given to a frog, produced paralysis of the central nervous system and heart. The symptoms begin with co-ordination disturbances, and then paresis and total loss of reflex action. The paralysis is sometimes preceded by severe tetanus. The heart's action is at first only slowed. Later, however, the contractions become less and less energetic. At first only the automatic cardiac ganglia, and later the entire cardiac muscles, are affected by the poison. In warm-blooded animals the medulla seems to be the seat of the poison's actions. Respiration is at first greatly increased, later paralyzed. Small doses will greatly increase the respiration, but only temporarily, and the animal soon recovers from the effects of the poison. If, however, the dose is frequently repeated, the breathing will soon cease, and artificial respiration will fail to restore the animal. The heart will still continue to beat for some little time.

During the first symptoms the heart's action is slightly increased. Internally and subcutaneously the substance does not act as a poison either upon pigeons or rabbits.

The above-mentioned product of oxidation of bitter acid of hops, and also the hop bitters which is contained in small quantities in beer, are not at all poisonous.—*Arch. für Exp. Path. und Pharm.*, xxiii. 129, and *Centralblatt für Therapie*, January, 1888.

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### *ANTIPYRIN IN EPILEPSY.*

In a thesis presented before the Lyons Faculty of Medicine, M. FRATY (*London Medical Recorder*, March 20, 1888) discussed the influence of antipyrin on the convulsions of epilepsy. On twenty cases treated with antipyrin, two were discarded on account of certain hysterical complications which obscured the diagnosis. In seven, a marked moderating effect was noticed on the convulsions, and in one of them the crises were suppressed during treatment and recurred

immediately on its cessation. In five cases the drug had to be abandoned on account of undefinable symptoms of malaise, but it must be observed that these five patients were the most disagreeable and obstinate of the hospital inmates. Two other patients refused to take antipyrin because of the nausea which followed its use. Lastly, three patients remained unaffected by the drug. He concludes (1) that antipyrin possesses an influence on epileptic convulsions, at any rate in some cases; (2) its action resembles that of the alkaline bromides; (3) that to obtain its effects it must be given in doses of from 40 grains to 2 drachms daily; (4) that the moderating effect, when present, is transitory, and that the attacks recur more violently than ever on the cessation of the treatment, and even during its continuance if prolonged.

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### *ALBUMINURIA IN THE APPARENTLY HEALTHY.*

This subject was recently discussed in a short paper, at the Islington Medical Society, by Mr. H. F. Stokes. He related a case in which a patient of his had been found, four years since, to have albuminuria by a consultant, who immediately took a very gloomy view of his case, and informed his wife that he would not live more than three months,—a prognosis refuted by the gentleman continuing in good health to the present time in spite of the persistence of albuminuria. There are no casts in the urine, and no other renal symptom. The urine is lithiacal, but this fault is largely influenced by the habits of the patient, especially in the matter of beer, which he used to take freely. When the beer is discontinued the lithiasis abates, and with it the albuminuria. In a happy interval of this sort the patient's urine was found free of albumen, and he was accepted for life insurance. Mr. Stokes mentioned two or three cases in which albuminuria existed for a long time in his experience without apparent harm, notably one of a gentleman still living, about 60, in whose urine twenty years ago he detected a considerable quantity of albumen, which still continues. This patient has been a great athlete, and has climbed every considerable mountain that can be climbed in Europe. He is now infirm with prostatic and cystitic troubles.

Mr. Keele related a case of acute nephritis, with hemorrhage, partial suppression of urine, convulsions, anasarca, etc., which did not prove fatal as expected. All the symptoms disappeared, but the albuminuria persists.

Dr. Glover gave some particulars of two cases of temporary albuminuria, one in a lady about 65, with severe vomiting, distressing headache, full pulse, and hot skin. There was, for one day, about a fourth of albumen. It was found that the diet had been too free, especially with regard to eggs, five of which had been taken in one day. A little starvation and purgation sufficed to remove the albuminuria and all the symptoms. In another case, that of a little girl about 6, with "cold-water" feeling down the back, followed by fever, sickness, and coughing, there was slight hæmaturia, with corresponding albuminuria. The albuminuria lasted only one day, and the other symptoms gradually abated with rest in bed and other treatment.

The disposition of the meeting was to believe, with Professor Grainger Stewart, that the gravity of mere albuminuria had been overrated.—*Lancet*, March 10, 1888.

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### *TREATMENT OF ROSACEA.*

Long since, the vascular nature of rosacea, in which the capillaries at times reach an enormous degree of dilatation, suggested the idea of treatment by incising the vessels at several different points in order to cause their disappearance. Bazin and Westerton first cut the vessels, and then cauterized them with perchloride of iron. Hebra, of Vienna, had a little instrument made with a triangular point, and a guard which prevented its too deep penetration (Stichelnadel). He employed it to make punctured scarifications of the surfaces attacked with rosacea. Dr. Vidal according to the Paris correspondent of the *Journal of Cutaneous and Genito-Urinary Diseases* for April, 1888, uses it also in certain cases, especially in sycosis, and in indurations of limited extent but deeply penetrating, complicated with intradermic abscesses. When these infiltrations are punctured in multiple points, they are indeed seen to be rapidly absorbed. Nothing can, however, be compared, as regards the efficacy of treatment in rosacea of a marked type, with linear quadrilateral scarifications. They should be made in a regular manner, at a millimetre or a millimetre and a half apart, quite long and deep enough to cut across the dilated and varicose vessels. If we have a hypertrophic acne to deal with, it can as well be modified for the better by this procedure, but here the derma

must be incised in nearly its whole thickness, but without reaching the subcutaneous cellular tissue, and much less the cartilage, so as not to leave visible cicatrices; and in this we are not guided, as in lupus, by the softness of the morbid tissue. Here, again, as in lupus, it must not be thought that we treat all cases of rosacea by this method. We only treat in this way at first those cases in which the dilatation is too far advanced, and the vessels too numerous for us to hope for any results from other means; otherwise we resort to other well-known forms of medication or alternate with linear scarifications. These latter may also be employed to cause the last traces of the disease and the varicosities to disappear, which, without this powerful intervention, would persist too long, if not permanently.

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### *ON THE OPERATIVE TREATMENT OF DISLOCATED SEMILUNAR CARTILAGE OF THE KNEE-JOINT.*

At a meeting of the Clinical Society of London, held Friday, March 9, 1888, MR. CROFT described the case of a laboring man, aged 39, who was admitted into St. Thomas's Hospital in April, 1887, for well-marked symptoms of dislocation of the internal semilunar cartilage of the right knee-joint (*Brit. Med. Journ.*, March 17, 1888). The joint had been attacked by rheumatic inflammation eight years previously, but had not been permanently lamed by it. The accident which had caused the injury to the cartilage, and consequent lameness, had occurred three weeks before the patient's admission to the hospital. As the man was quite incapacitated from following his employment, and suffered frequently from the displacements of the cartilage, Mr. Croft advised him to submit to a radical operation. In the belief that the anterior extremity of the cartilage had become detached, Mr. Annandale's operation was decided on. The joint was opened on March 5, 1887. The cartilage was found to have preserved its anterior and posterior attachments, but to have been torn loose from its intermediate connections. It was lying in the intercondyloid space. A tongue-shaped piece, about three-eighths of an inch in length, projected from its upper surface. This had been partly torn up from the upper surface of the cartilage. This was a worse condition than had been expected. The anterior and posterior insertions were cut through, and the cartilage drawn out of the joint. The joint was carefully closed. Drainage was provided for. The operation was done antiseptically. On the fortieth day after the operation the man was discharged cured. He was seen four months later, and then had been in full work for some time. He attended for inspection by the members of the society. Mr. Croft referred to the few positive data in English works concerning the subject, and drew the following deductions: (*a*) That the cartilages may be dislocated from their anterior attachments only, from their circumferential attachments only, and from both these insertions. That rupture of the posterior insertion must be very rare, if it ever occurs. (*b*) That when the circumferential relations are ruptured the cartilage tends to be displaced into the intercondyloid notch. (*c*) That in such cases as Mr. Annandale's a good result may be obtained by refastening the loosened anterior portion of the cartilage to the tibia, and that in such cases as Mr. Brodhurst's and his own (that above described) the whole cartilage may be safely excised. (*d*) A workingman may preserve a strong, useful, movable knee-joint, though the whole internal cartilage has been excised. (*e*) Obstinate cases of this dislocation, attended by numerous attacks of pain and disability, may be safely subjected to "inspection," and, if need be, to operative treatment for radical cure.

MR. ANNANDALE (Edinburgh) said he would confine his remarks to the displacements of the semilunar cartilages and the operation which he had suggested for the relief thereof. He had operated in five cases, the result in all of them being perfect. In four of the cases the internal cartilage was the one displaced, and this was usually the case. He had found it displaced in three different manners; in two of his cases the cartilage was separated at its inner attachment, and was displaced backwards and outwards; in one case the cartilage was separated and folded upon itself; in another case the internal edge was folded over, and the joint had thereby become sometimes locked; this locking occurred also at the operation, when, the joint being opened, it was found that the cartilage was partly in the intercondyloid notch, which was the cause of the locking. In his fifth case, the external cartilage was separated and displaced backwards. As to the operation, he made an incision around but a little below the upper articular surface of the tibia, a little lower than would appear to be necessary for the opening of the joint. The

articulation being exposed, and bleeding all stopped, the capsular ligament was opened, and with a blunt hook the cartilage was drawn forwards, and then fixed in position by two or three stitches to the capsular ligament and head of the tibia. In his last two cases he had fixed it with a catgut ligature. He used no drainage-tube, finding it unnecessary. He did not venture to move the joint earlier than six weeks after the operation. At first he used passive movement only, and no active movement until quite a fortnight later.

MR. DAVIES-COLLEY mentioned a case on which he had operated five months previously. The patient was a gentleman, aged 21, who was riding, when his horse reared and fell on his knee, which soon became much swollen. All did well, however, until some six months afterwards, when, as he was playing lawn-tennis, his knee-joint became dislocated outwards, abducted, semiflexed, and fixed. The dislocation was reduced, but synovitis followed, and the dislocation thenceforward recurred frequently, causing severe pain. Often when on horseback he had to roll off his horse in order to rectify the dislocation, which was not prevented by knee-caps, etc. Mr. Davies-Colley then proceeded to operate in the manner which Mr. Annandale had described. He found that the internal cartilage had two rents in it, running parallel, and thus dividing the cartilage into three ribbons. It had doubtless been split at the time of the original accident, improved by the two months' rest which followed it, and then again separated by the sudden strain during tennis. He had stitched the strips together so as to fix them to the internal tuberosity of the tibia. The case did fairly well. There was at first a discharge of gelatinous material from the joint; but after a fortnight this ceased, and the catgut sutures were discharged at intervals. After two months the patient could bend the knee through an angle of about sixty degrees, and he could now walk about four or five miles, wearing a support which kept the knee fixed. Mr. Davies-Colley did not think it would be right to allow the patient to use his joint without support until six or eight months after the operation. He would ask what was the best treatment to adopt in such a case?

MR. H. ALLINGHAM remarked that he had shown at a former meeting a porter who had dislocated his internal cartilage. In October last the speaker had cut down upon the cartilage, found it movable, and had fixed it to the bone. The patient was now well, and could walk well.

The CHAIRMAN said that the semilunar cartilage was evidently not necessary to the functional use of the knee-joint. He alluded to a paper published by Professor Kocher, which also supported that conclusion. The cartilage in Kocher's three cases being affected with a fungous disease, he removed it entirely, and the joint was just as good after as it had been before the operation. He exhibited an apparatus recommended for many years past by Sir James Paget, which was very beneficial in many minor conditions of displacement, and which, if worn for twelve or eighteen months, often produced complete cure.

MR. H. MORRIS thought that one form of dislocation had not been noticed by previous speakers, that which he designated "marginal." It might be produced in two ways: (*a*) where a sharp instrument ran into the cartilage, and then upon being pulled out dislocated the cartilage outwards; (*b*) where the knee was dislocated outwards and the semilunar cartilage was forced outwards from the head of the tibia.

MR. CROFT said his case was verified by inspection of the interior of the joint; in this was its great value; it was not a mere surmise, as were so many other cases in which the joint was not inspected. He thought that possibly in Mr. Davies-Colley's case convalescence would have been quicker and more absolute if the strips of cartilage had all been removed at the time of the operation.

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### *A NEW TREATMENT FOR HEPATIC COLIC.*

Physicians have been practically powerless to relieve that painful affection known as "gall-stone colic" or hepatic colic, and therefore any treatment which claims to have the power to afford relief must be soberly looked into, even though the means employed may seem absurdly simple and even ridiculous. The story of this treatment is as follows: In the "wild West" of the United States there lives a practising physician, who some time ago was greatly troubled by hepatic colic, which all his skill failed to relieve. The village blacksmith noticed the sufferings of the doctor, and inquired the cause of his pains. "I'm suffering horribly with my liver," said the suffering medico. "Would you like me to cure you?" asked the smithy, and then told how he had suffered similarly

himself, and how he had been cured. The physician took the remedy, and that very evening evacuated from fifty to seventy gall-stones! In deep gratitude the doctor gives the remedy and the method of its employment to the profession.

To twenty-four spoonfuls of "water soup" (hot water?) two large tablespoonfuls of pure olive oil are added. This dose should be divided into two parts and taken within fifteen minutes of each other, and, after a few hours, during which time the patient must lie on his right side, the pain will vanish and the gall-stones be evacuated. In case of a relapse, the dose should be given again.

Now, this story was told by the Western doctor himself to a physician in New Orleans, who, in his turn, wrote to the *Archives Roumaines* of Paris about it. They published it, and later the *Medicinisch-Chirurgische Rundschau* saw it, translated it, and put it in their number of February 15 of this year. Here we have it, and again translated it into its "mother-tongue." It is passing strange that such an important therapeutical discovery should have taken such a roundabout way of coming here, and, as far as we can ascertain, it has taken it over a year and a half to get here.

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### *THE TREATMENT OF WHOOPING-COUGH BY ANTIPYRIN.*

The results obtained by SONNENBERGER in seventy cases of whooping-cough by means of antipyrin were very satisfactory (*London Medical Recorder*, March 20, 1888). In very young children, the drug should be given three times a day in doses of from 1 to 3 grains. In older children and in adults the dose may be raised even to 15 grains. He gives it generally with a syrup of raspberries to disguise the taste. Under its influence the attacks diminish in frequency and the general condition of the patient improves. The results are more striking when the treatment is begun early in the disease. When this was done the disease ran its course in from three to five weeks, with an average of from six to seven attacks of coughing during the twenty-four hours.

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### *THE VALUE OF RESORCIN IN SOME GASTRIC AND CUTANEOUS DISORDERS.*

As regards the external effects of resorcin, it is known that a one per cent. solution will retard, and one of two per cent. will arrest, fermentation, coagulating albumen. These strengths do not irritate the skin, but stronger solutions have a more or less irritant, and even caustic, effect. *Internally*, 5-grain doses are readily taken in any simple vehicle without gastric irritation, and though the taste is harsh, it has been considered, by contrast with some other medicines, pleasant enough by many. It is not required to give larger doses, but in reports of the effects of from 20 to 30 grains we find resemblance to the effects of alcoholic and other stimulants,—*e.g.*, quickening of pulse, flushing, giddiness, and tinnitus, afterwards sweating and depression of temperature, increased secretion of saliva and of tears; dilatation of vessels and dyspnœa have also been described. Dr. Murrell, by giving 30 grains to an asthmatic patient, relieved the spasm, with induction of sleep and no ill-effect; but after 60 grains there occurred giddiness, headache, and nerve excitement, followed by prostration and collapse, with temporary unconsciousness. In other cases paralysis has been noted, and in those of Dujardin-Beaumetz convulsion and other evidence of profound impression on nerve-centres, as after toxic doses of carbolic acid. It is for such an impression, less in degree, and also for lowering high temperatures, that the drug was early used, and we have numerous reports of more or less success from it in enteric fever, erysipelas, pneumonia, intermittents, etc. From these, which are mostly in continental journals, the antipyretic power of full doses is evident; but what is less evident is any real advantage conferred by this temporary effect.

DR. EDWARD MACKEY (*Lancet*, March 24, 1888) extends still further the field of usefulness of this remedy to its employment in the treatment of cases of gastric ulcer, and he reports in considerable detail a typical case of gastric ulcer in which 5 grains of resorcin in glycerin and water were administered three times daily. Within a week great improvement was noticed, and cure seemed to be obtained. The author further states that he has notes of seventeen similar cases, varying in chronicity and severity, occurring among the poor in out-patient departments, who had previously at various times taken bismuth, prussic acid, alkalies or acids, rhubarb, etc. Only one of them, a woman at the climacteric period, failed to attribute decided benefit from the resorcin, and to ask again for it. Dr. Mackey states that he has met with no drawbacks in its use, such as vomiting or constipation. In a few cases, however, giddiness, which might have been due to it, disappeared when the dose was

lessened to 3 grains, although his usual dose was 4 or 5 grains in one teaspoonful of chloroform-water, to which plain water would be added.

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*URETHAN.*

Urethan is one of the newest hypnotics. SCHMIEDEBERG, in the *Arch. für Exper. Pathologie und Pharmacologie*, xx., gives it the formula $CO<\begin{matrix}NH_2\\OC_2H_5\end{matrix}$. It is a colorless crystal, which comes in the form of columns; has a peculiar, bitter taste; melts at a temperature of 48° or 50° C.; boils at 170°; when lighted, burns with a pale flame and leaves no residue; easily soluble in water, alcohol, ether, and chloroform; of a neutral reaction.

Doses of 15 to 30 grains usually produce sleep, lessens the desire to cough, and increases diuresis.

The remedy has already shown itself to be of considerable value. Its use is indicated in the following cases:

1. In conditions where sleep is needed; its action is, however, rendered difficult in cases where cerebral excitement exists (see Schmiedeberg).

2. In nervous agrypnia and weakness accompanied by loss of sleep (Sticker).

3. In cardiac cases (Sticker, Saundry, Huchard), whereby the drug excites no influence whatever upon the heart.

4. In phthisis, etc.

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*THE PRESENT STATE OF CARDIAC THERAPEUTICS.*

Dealing with the treatment of acute inflammatory affections of the endocardium, DR. STEWART (*London Med. Recorder*, March 20, 1888) points out the value of rest. Rest means low blood-pressure, and consequently less work for the valves to do. This may be assisted by the administration of drugs which lower the blood-pressure, such as chloral. He disapproves of blisters over the præcordia and blood-letting, the former because injurious, and the latter because of only temporary benefit. With reference to the treatment of cardiac disease during the period of compensation, he speaks very favorably of Oertel's plan, which consists in strengthening the muscular system, comprising the heart, by regular and graduated out-door exercise; aiding nutrition by a diet rich in albumen, and by careful regulation of the quantity of fluids ingested. This plan of treatment is probably adapted to cases of threatened heart-failure from commencing fatty degeneration and from deformity of the chest or disease of the lungs. When loss of compensation renders exercise impossible, then digitalis is of great value. The first marked effect of heart-failure is diminution in the aortic blood-pressure, as shown by a diminished excretion of urea. So long as digitalis causes an increase in the quantity of urine, so long is it safe to proceed with its administration. The diuretic power of digitalis is entirely dependent on its power of raising an abnormally low blood-pressure, and to effect this it must be given in full doses. When the urine, after being increased in quantity by digitalis, considerably diminishes, then the drug should be at once withdrawn. This decrease is a warning never to be neglected. As to the quantity of digitalis required to bring about diuresis, great differences are found, persons varying greatly in their susceptibility to the influence of the drug. Forty minims of the tincture four times daily for three days will, in the majority of cases, bring about the diminution, but as much as half an ounce daily in divided doses is sometimes required. The best results are obtained by absolute rest in bed, with digitalis in full doses. Other drugs besides digitalis possess the power of slowing the heart and increasing the blood-pressure. Scillain, helleborein, oleandrin, adonidin, convallamarin, and, finally, strophanthin. Mercury is a direct diuretic. Hence the value of the old combination of digitalis, squills, and mercury (Baly's pill). All these remedies are useful in particular cases, and Dr. Stewart speaks very hopefully of strophanthin, the latest addition to our list of heart-medicines. He also speaks very favorably of the effect of caffeine, especially of the sodium-salicylate of caffeine. It is a powerful direct diuretic, acting on the epithelium of the convoluted tubules, and probably on that of the glomeruli. It acts very promptly. A combination of digitalis and caffeine affords very excellent results.

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*MENTHOL IN LARYNGEAL PHTHISIS.*

Following the suggestions of Rosenberg, of Berlin, MR. BEEHAG has employed menthol in pulmonory and laryngeal phthisis and reports his results in the *Australian Medical Gazette* for February, 1888.

A twenty per cent. solution of menthol in olive oil is the strength generally employed. Olive oil will take up more than twenty per cent. on heating, but the menthol will recrystallize when exposed to a low temperature,

and the mixture form a solid mass. Slightly warming will cause it to redissolve, and in this manner we can use the drug in a highly-concentrated form. The solution is injected into the larynx, directly on to the part affected, under the guidance of the laryngeal mirror. The syringe serves for injecting the fluid both into the larynx when it is the seat of the disease and into the trachea when the lung only is affected. It is better, especially in the case of laryngeal phthisis, to make two or three injections of about 10 minims in each at one sitting. By this means more prolonged contact of the agent with the diseased tissues is secured. After each injection the patient should be made to take deep inspirations, whereby the cooling and anæsthetic effect produced by the menthol is accelerated. No danger whatever results from such an endolaryngeal method of treatment, and no untoward or disagreeable effects follow the introduction of such large and concentrated solutions of menthol into the system. The patient at first feels a slight burning sensation in the larynx, which is quickly replaced by a cool, pleasant feeling, and in a few minutes a warm sensation is experienced all over the chest, due to the solution finding its way into the lungs; which it does, according to Reichert's experiments of a series of twelve endotracheal injections on calves and sheep, even to the finest bronchioles. This should be performed at first every day for about two months, and the treatment by injections should be continued by inhalations, of 5 minims, or as much as the patient can bear of the same solution, in a pint of steaming water. These inhalations should be used frequently,—if possible, every hour during the day in the early part of the treatment. A convenient method, also, is to make the patient wear a piece of cotton-wool wetted with the solution before the mouth and nose. The patient sometimes finds it more convenient to sleep with this on during the night.

Menthol possesses in a marked degree the anæsthetic action of the oxy-hydrocarbons of the volatile oils. A few minutes after its application pain and other uneasy sensations in the larynx disappear, and that *bête noir* in laryngeal phthisis—viz., dysphagia—is combated to such an extent that the patient is at once enabled to eat without pain. The effect of this can be readily appreciated. Nutritious foods can be taken into the system, and the general health of the patient thereby improved. With regard to the anæsthesia produced by menthol, Rosenberg has pointed out a very important fact,—viz., its cumulative effect. "After the first injection," says Rosenberg, "the anæsthesia lasts from one to three hours; after the second or third still longer, so that after a week the effect lasts for a whole day." The antiseptic properties of menthol also are very marked, as has been experimentally proved by Koch and other observers upon various forms of bacteria. Rosenberg has demonstrated its distinctive effect upon tubercle-bacillus by exposing pure cultivations of this organism to the influence of menthol in a gaseous form. Shortly after the beginning of the treatment one sees an improvement in the condition of the patient. If the larynx be the seat of the disease the hypersecretion soon becomes diminished, and the whole surface of the larynx becomes much cleaner. This is also shared by the ulcers, which finally heal, leaving beautiful smooth cicatrices, better than one sees after the use of lactic acid; but there are certain cases which do not yield to treatment so readily, and these are marked infiltrations and hypertrophies. These yield better to the application of lactic acid; but even here the resistance to treatment is very great, and is greatly accelerated by first curetting the infiltration with Hering's laryngeal curette, and afterwards by the employment of either menthol or lactic acid, or of both, because menthol is a very useful adjuvant in the lactic-acid treatment, where it should be injected two or three minutes before the application of the acid. By this combined method a quicker result is obtained, for even by itself the lactic acid brings about quicker cicatrization of the ulcers. But there are certain advantages which the menthol has over the lactic-acid treatment. The former, if precisely applied with the laryngeal syringe (and not with the brush, which causes pain), is not unpleasant to the patient in its application, and when the subjective symptoms in the larynx are subdued, some few minutes afterwards, the patient's spirits are raised and the appetite at once manifests itself, especially if dysphagia were a symptom, so that the patient, as has frequently been the writer's experience, gets to enjoy the treatment. In the case of lactic acid, where one must apply the remedy accurately and vigorously for a few seconds (best done by a piece of cotton-wool affixed to Krause's Kehlkopfpincette or to Hering's Tamponträger), one can readily understand that such vigorous treatment is not at all unaccompanied by pain.

What also is a very important advantage in the menthol over the lactic acid is that in the

former the medicament is not confined to one spot, but extends over a large surface,—viz., the whole of the larynx, trachea, bronchi, and bronchioles. A case in point will illustrate the fact. At the Society of Naturalists and Physicians, held in Berlin, 1886, Hering, of Warsaw, produced a larynx to show that he had cured a laryngeal ulceration by the lactic-acid treatment, but which showed suspicious points in other parts of the larynx, and which were pointed out by Professor Chiari, of Prague, as being probably miliary nodules. These points were afterwards microscopically examined by Virchow, who pronounced them to be tubercular. Certainly the tubercular ulcer had been healed in this case, but the tubercular disease had not been wholly exterminated from the larynx.

Besides improvement and cure in the laryngeal condition, a similar result is also obtained in the pulmonary condition if the patient comes early enough under treatment. Directly after the injection the patient experiences a remarkable freeness and lightness in breathing. The sputa, during the course of the treatment, gradually lose their nummular character, become less and less purulent, and finally disappear. There is a marked diminution in the cough, and an improvement in the voice. The night-sweats diminish, the bodily weight increases, and the system generally is improved. Rosenberg relates the very interesting case of a patient affected with both laryngeal and pulmonary phthisis in its early stage, who was treated by him with menthol. This patient afterwards presented himself to be examined by a well-known expert of a life insurance company, and on the strength of this examination was enabled to insure his life in the ordinary manner. One should not give up the treatment too early, though later the applications may be made less frequently. Of course, it is not pretended that very confirmed cases of phthisis can be cured by this method of treatment, but its employment here relieves many of the distressing symptoms. The sputum is more easily expectorated, the coughing much alleviated, and the morbid processes for a time retarded. With the object of procuring prolonged contact of the agent with the larynx in phthisis laryngea, especially when there is much secretion present, Mr. Beehag has introduced a powder to be insufflated. Its composition is as follows: Menthol, ʒss; ammonium chloride, ʒiss; boracic acid, ʒi. Misce: fiat pulvis. This powder, when pulverized very finely, is very useful in chronic laryngeal catarrh. In the form of snuff, a pinch of it may be taken frequently into the nostrils for acute and chronic nasal catarrh, and will be found to cause a great diminution in the purulent secretion. Directly after it is taken a flow of watery mucus is induced, and thereafter the nose remains cool and free. The marked antiseptic properties of this snuff, and its power of causing a copious secretion, led to its use in idiopathic ozæna, and the results obtained have been very satisfactory. The horrible fœtor is quickly removed, and the frontal headaches disappear. The nose becomes freed from crusts, and its mucous membrane will be seen to be in a moist condition and of a more healthy aspect. The snuff should here be taken frequently, and the secretion which follows its use should be retained in the nose with the object of softening the crusts and rendering their expulsion easy. If they have been previously expelled this precaution will prevent their reappearance. The patient should also be enjoined to draw the powder back through the nose into the mouth, with the object of reaching the crusts in the naso-pharynx and of relieving the dysphagia and hawking concomitant to pharyngitis sicca. If, by way of experiment, some of the powder be insufflated into the naso-pharynx, the pharynx which was previously dry and shining will now be seen to be bathed by a copious moist secretion.

Menthol is a vascular stimulant and quickly reduces swelling of the nasal mucous membrane. It also possesses the power of what Jelineck pointed out with regard to cocaine,—viz., of reducing erectile swelling of the inferior turbinated bone by emptying the cavernous tissue of its blood. Thus menthol is indicated in those cases of nasal obstruction due to these causes, and will be found to be extremely useful in those cases of rhinitis, associated with a purulent secretion, so commonly met with in scrofulous children. Some short time ago a woman came to the author complaining of her child suffering from "snuffles," with inability to sleep and nurse properly. The other members of the same family showed distinct evidences of syphilis, and the child itself was being treated for the same disease by the family doctor. On examination Mr. Beehag diagnosed the case to be syphilitic rhinitis in the first stage, and ordered the interior of the nose to be painted several times daily with a five per cent. solution of menthol in olive oil; the effect was immediate; the child could nurse with ease, slept soundly, and showed other signs of general improvement. The importance of rendering

the nasal passages clear in suckling children, with the distinct benefits which accrue, as in the case just mentioned, need not be dilated upon.

Menthol has a decided action in relieving the pain and swelling in acute catarrhal angina. A twenty-five per cent. solution of it in olive oil should be copiously applied to the pharynx by means of a large soft brush. The pain and dysphagia are relieved, the patient is enabled to secure sleep, and the attack is cut short. In some cases the speedy subsidence of the swollen and inflamed tonsils has been remarkable, without any abscess formation. If there be acute rhinitis accompanying the disease, the solution should be painted into the nostrils also, the strength of the solution for this purpose being from five to twenty per cent., according to the age of the patient.

In cases of chronic pharyngitis, with local or reflected pains, Mr. Beehag uses the well-known Mandl's formula, with menthol superadded, the prescription being as follows: Iodine, gr. vi; potass. iodid., gr. xx; aqua, ʒiii; menthol, ʒiss; glycerin, ʒvi. Misce. The menthol here is suspended in a state of fine subdivision.

As might be expected from the action of menthol in other forms of neuralgia, it gives relief in otalgia by dropping a strong solution of it, in olive oil, into the ear.

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### *THE TREATMENT OF CHRONIC BRONCHITIS OF THE AGED.*

Dr. Wyss, of Geneva, writes (*London Med. Recorder*, March 20, 1888) as follows: "Of the many remedies employed in this complaint the following deserve special notice:

"1. Naphthalin, $C_{10}H_8$, is the product of distillation of coal-tar, of which it possesses the disagreeable odor. It possesses some of the physiological properties of camphor, and acts as an energetic expectorant and stimulant. It is best prescribed in the form of medicated pastilles, each containing .10 to .50 of a gramme (1 ½to 8 grains), to be taken three times daily, or as inhalations, being very easily volatilized by the action of steam.

"It should be very carefully used on account of its irritant effects on the renal tissue, and the peculiar modifications in the nutrition of the eye from its continued use, which have been described by oculists (Dox, Panas, Magnus) under the name of naphthalinic cataract and retinitis.

"Magnus, moreover, observed in animals which he had submitted to the prolonged action of naphthalin constant emaciation and even arrest of development.

"2. Terpine, $C_{10}H_{16},2H_2O$ + aq. Its use as an expectorant has been strongly advocated by Dr. Lepine, of Lyons. It is given in doses of .20 to 1 gramme (3 to 16 grains), and more.

"Occasionally symptoms of gastro-intestinal irritation after its longer employment have been noticed. This remedy ought to be taken during or immediately after meals, in form of pills. ℞ Terpin. hydrat., 3 grm. (2½ scruples); sacch. alb., mucilag. gummi acac., āā q. s. ut f. pil. No. 30. S.—Three pills daily.

"3. Terpinol, $C_{20}H_{16}O$, represents an oleaginous, colorless liquid of a faint hyacinth scent. It is a perfectly harmless substance, which is principally eliminated by the lungs, liquefying the bronchial secretions. It may be prescribed either in pills or in gelatinous capsules containing .10 of a gramme (1½ grains), in daily doses of .5 to 1 gramme (8 to 16 grains).

"4. *Lippia Mexicana* (a Verbenacea), the concentrated tincture of which is recommended by Dr. France, who considers it one of the most efficient expectorant and soothing medicines. In all kinds of bronchial irritation, complicated with violent attacks of cough, the tincture of *Lippia Mexicana* has always been of uniform action and produced rapid relief.

"5. Menthol, $C_{10}H_{20}O$, the camphor of mint, has proved an excellent expectorant. It is generally prescribed in the form of inhalations, which not only facilitate and rapidly diminish the expectoration, but also allay the violent attacks of cough, which so much exhaust the strength of the patients."

For the administration of these inhalations Dr. Wyss has devised an apparatus (made by Mr. Penfold at Genoa, price five francs,—*i.e.*, four shillings) resembling the Turkish narghilé. Its use is very easy, and does not fatigue the patient. It conveys the aqueous vapor charged with the medicament, and sufficiently cooled by a current of air which passes through the apparatus, to the mucous lining of the bronchi, instead of barely passing the larynx, as is the case with other kinds of inhalers. The beneficial effects of these inhalations are most striking.

## Reviews.

THE SURGICAL DISEASES OF THE GENITO-URINARY ORGANS, INCLUDING SYPHILIS. By E. L. Keyes, A.M., M.D.
New York: D. Appleton & Co., 1888.

The above work is a revision of the original treatise, upon the same subjects, published first in 1874 by Drs. Van Buren and Keyes. There have been many changes made in the context, much new material has been added, but it will be found that the plan of the original book has been adhered to, and it essentially covers the same ground. The work when first issued proved to be a most valuable one, and met with a very favorable reception, both from the profession and critics. However, as the author says, "Time and surgical advance have destroyed in great part the value of the original treatise." The necessity for a more thorough revision was quite evident, and that this task has been done by one of the original authors is most fortunate. None could have done it better, and few equally so well. As an authority upon all questions of genito-urinary surgery, Dr. Keyes is second to no one in this country, and he writes in his preface, "The book, as it stands, is an honest exhibit of my views upon all the subjects considered."

Without making any attempt to review the entire book, we may select such portions that opinion has been and is still undecided upon in regard to the nature or treatment of certain affections, and which, during the past decade, have given rise to much controversy. Among such diseases is gonorrhœa, more especially with reference to its etiology. Is there a specific cause, and has the specific germ been discovered? Dr. Keyes writes, "That there are two maladies—one virulent and one simple—is and always has been certain; the difficulty has been to distinguish between them." This difficulty our author believes has now been removed, and, with the aid of the microscope, the diagnosis may be made. The gonococcus of Neisser is believed by Dr. Keyes to be the contagious element in the discharge; yet its practical application is said to be not all that is desirable, since it is found that all contagious discharges unquestionably contain typical gonococci. There are, however, some cases in which the organism certainly exists, but where intercourse is practical without the disease being communicated. The conclusions are, "A discharge not containing gonococci is certainly not contagious;" and again, "A discharge containing gonococci, however, is not necessarily contagious in a virulent way." We have as yet not been convinced of the specific nature of gonorrhœa, and Neisser's gonococcus as its specific germ seems to us not yet to be proven.

The chapters given to stricture of the urethra are most excellent, being evidently the result of much experience in the treatment of this very frequent lesion. The methods of treatment which should be adopted to relieve the affection have been well chosen by Dr. Keyes, and are those which we have employed with very gratifying success. We fully agree with our author in his opinion of the very unsurgical and at times dangerous operation of divulsion, which he terms "a rough manœuvre." Internal urethration is recommended for all strictures situated anteriorly to the bulbo-membranous junction, and the operation is thought to be best performed by the use of Otis's urethrotome. Resilient, very irritable, and, as a rule, traumatic strictures of the deep urethra, are advised to be cut externally, or by combined internal and external urethrotomy; while other strictures of this region are said to be treated more satisfactorily by gradual dilatation. In the treatment by gradual dilatation, the steel sound is given the preference, both from its more easy introduction and more rapid effects. The rule of never using a steel sound smaller than a No. 15 is to be strictly observed. When smaller instruments are required, the flexible ones must be used. Electrolysis as a means of treatment in stricture of the urethra it is thought will not prove successful. His experience has not been encouraging, and it is placed among the condemned methods. In regard to the very important question of the prognosis in cases of urethral stricture after operation, Dr. Keyes writes, "Strictures of the anterior region, if very freely cut, may be radically cured; not so strictures of the deep urethra;" and again, "In the light of modern experience it may be safely stated that all true strictures of the pendulous urethra may be radically cured by free cutting internally."

Diseases of the prostate are fully considered, and the chapters on hypertrophy of this gland, while presenting nothing new, are, nevertheless, well worthy of careful study. The etiology of this lesion is said to be unknown, and that "the numerous hypotheses which have been advanced by authors need not be discussed; they do not cover the ground. No known diathesis or combina-

tion of circumstances can account for the affection." The treatment recommended for this disease is first to use palliative means,—catheterism in connection with alkaline diuretics and diluents. When these fail to relieve the patient, or to protect his general health, then more radical measures may be tried, and the operation of removing a portion of the prostate, either by performing suprapubic cystotomy or perineal section, is advised; yet such surgical interference should never be undertaken unless the symptoms are very urgent, especially when they do not always end in a positive cure. The operation suggested, and performed with success by Harrison, of puncturing through the perineum and prostate into the bladder, and leaving in a silver tube, to produce atrophy, is one which seems to us surrounded with less danger than the other surgical procedures that have been advised for this affection, and the results obtained by Harrison have been equally as good.

There has been much discussion among surgeons in regard to the operation of cystotomy, either for exploratory purposes or for the removal of tumors. That the operation is justifiable, in suitable cases, none dispute, but it is the method of procedure that is still undecided,—whether it is best to enter the organ by performing a laparotomy, the suprapubic method, or to reach it by a perineal section. There can scarcely be any question as to the latter operation being less dangerous to the patient than one in which the abdominal cavity is cut into, notwithstanding we fully recognize the comparative safety of laparotomy by strict antiseptic precautions; but, on the other hand, the difficulties that may be met with, in removing tumors through the perineum, may be such as to make the suprapubic operation the more desirable one. In our opinion, the choice of operation must always depend upon the nature of the case, but we are inclined to give the preference to perineal section. Dr. Keyes's experience, however, has led him to decide in favor of the suprapubic method.

The chapters on stone in the bladder are the most able and valuable in the book. Many useless discussions and theories have been wisely omitted. The article is eminently practical, just such information and directions that an inexperienced surgeon needs, and enough theory to satisfy all. Dr. Keyes says, "Lithotrity is dead, having disappeared from surgery as its brilliant child and successor, litholapaxy, established its claims;" and litholapaxy is defined as follows: "To catch the stone with an instrument passed through the urethra, to fragment it sufficiently for the detritus to pass out through a tube, and to suck out the *débris* by some suitable apparatus." This method of removing a vesical calculus is given the preference by our author. He writes: "There is, in short, no contraindication except very great size of the calculus or phenomenal hardness, and such conditions as a foreign body for a nucleus unsuitable for crushing (glass, lead); and, finally, concomitant conditions, tumor, intense vesical inflammation calling for subsequent drainage, etc." In the exceptional cases it is advised to perform either lateral or suprapubic lithotomy, and of these methods the suprapubic is considered the most desirable.

The affections of the kidneys in which surgical methods are applicable, the diseases of the testicle, scrotum, and cord, with maladies involving the genital function, conclude the first part of the book. Their consideration is necessarily brief, but most points of importance are touched upon, and the methods of treatment judiciously indicated.

Part II. treats of "Chancroid and Syphilis." The chancroid is believed to be a local specific lesion, and can only be produced by contact of pus from a similar ulcer. The treatment recommended is first active cauterization, and then to employ rest, cold, and astringents to combat the inflammation. Here we venture to differ from our author. We have had much more satisfactory results by entirely discarding the unnecessary and extremely painful cauterizing methods he advises, and also, we believe, have avoided the complications that such methods are liable to determine. The chapters devoted to syphilis give all the important information connected with this disease, omitting all useless discussions upon theories which are purely speculative; but the facts that are established we have presented in a concise and clear manner. The views held by Dr. Keyes upon some of the disputed points, in the course of syphilis, we have noted in our reading, and find that he does not believe that the germ of this affection has yet been discovered. He writes: "In any case it cannot be now asserted that a living contagious element of syphilis exists, although it is more than probable that such is the case, and that it will be one day triumphantly demonstrated." The possibility of the transmission of syphilis to the lower animals is thought not yet to have

been proven. Syphilis is said to commence always as a chancre, except in cases of inherited disease; that a mother may be infected through the child, the father being syphilitic, is thought not yet to be doubtful by our author. The chancre is believed to be a local manifestation of a systemic disease; the patient is said to have syphilis before his chancre appears. The conclusions given in reference to the duration of syphilis are, "that while symptoms which can depend upon no other disease than syphilis may crop out at any period during the life of a patient who has once had syphilitic chancre, yet the virulence of the disease and its contagious properties do die away in time, what are left being more properly sequelæ in the received acceptance of that term." The rule given in regard to syphilis and marriage is, that if, after a period not earlier than four years after contracting the chancre, the patient has for a year not shown any symptom of the disease, and during the last year there has not been for six months any treatment, he may marry. The chancre being considered always as an evidence of syphilis, its local treatment, in any form, is thought useless to prevent constitutional contamination; therefore cauterization or excision are condemned as abortive methods. The internal treatment of syphilitic chancre is advised "when the diagnosis is undoubted," and "where there is the least shadow of a doubt, no mercury should on any account be administered until an eruption has cleared up the diagnosis." Mercury is the drug relied upon in the treatment of general syphilis. Its administration is to be continuous, and, if possible, the same preparation of mercury is to be employed. The drug recommended is the protiodide of mercury. The tonic method of treatment by mercury, which was first advocated by our author, is described as "the use of mercury in such a way in the treatment of syphilis by elimination (persistent long course of a specific drug) that the mercury, over and above its antisyphilitic effect, shall act as a tonic,—that is, shall increase the number of the red blood-cells, and the general consciousness of health and vigor in the patient. I do not mean that mercury cures syphilis *because it is a tonic*, but that it may be used efficiently in such a way that it shall be a tonic." The lesions of syphilis which may affect the skin, mucous membrane, eye, ear, special organs, and tissues are all described, with visceral syphilis, syphilis of the nervous system, and inherited syphilis.

The scope of Dr. Keyes's work can, in a measure, be conceived from the above imperfect outline of its contents. Its value, however, cannot be appreciated without a careful study of its pages, and we believe it to be a most reliable book, one suitable for both student and practitioner. The publishers' part of the work is most commendable.

J. H. C. S.

DISEASES OF THE SKIN. By John V. Shoemaker, M.D., Professor of Skin and Venereal Diseases in the Medico-Chirurgical College of Philadelphia.
New York: D. Appleton & Co., 1888.

It is not many years before the specialist begins to feel a longing for a text-book bearing his authorship. With this feeling he soon sees the necessity, and the actual appearance of the work is then but a question of time. The specialty of dermatology seems particularly prone to develop this tendency. There is scarcely a dermatologist whose hand-book or text-book does not adorn—and many burden—the shelves of medical literature. Our surprise with regard to the present volume, in this respect, is not that it has appeared, but that it has been so long in coming. Still, we fear there must have been a dearth of dermatological text-books, otherwise we cannot explain the appearance so rapidly, in a few months, one after another, of the three large octavo volumes by McCall, Anderson, Jamieson, and Shoemaker.

In the volume before us we have discovered but little in the descriptions, etiology, pathology, etc., different from other well-known text-books; in fact, recent writers, almost without exception, have, to a large extent, followed, directly or indirectly, the descriptions, etc., of the sterling works of Tilbury Fox and Duhring. This is, however, no discredit. The main body of the present work, in its arrangement and classification, differs very little from similar treatises. The author has followed Robinson in placing psoriasis among the hypertrophies; and also in separating lichen ruber and lichen planus, considered by most authorities as manifestations of the same process. Lichen ruber is here placed among the hypertrophies, and lichen planus remains among the inflammations. Admitting the right of an author to shape his own book, we cannot but feel that in giving so much importance to individual opinion the effect is to obscure and not to aid dermatological classification. An expression of an opinion may be easily made without necessarily reclassifying. In the diseases referred to,

moreover, the propriety and correctness of the position taken have as yet failed of corroboration. Indeed, our knowledge of the etiology and pathology of skin-diseases is not sufficiently advanced to justify a departure from the prevailing classification. Another error of judgment we think the author has committed is in making tumors synonymous with neoplasmata. Naturally tumors are a part, and a great part, of the class neoplasms, but it appears close to an absurdity to call, for instance, either lupus erythematosus or telangiectasis a tumor. No reference is made to the group of symptoms lately described by Duhring under the name of dermatitis herpetiformis. Opinions may differ as to the propriety of the name which has been given to these cases, but the existence of such and their importance are admitted by all. Again, but a half-page is given to the consideration of pityriasis rosea ; and yet for many reasons the disease is an important one, especially for its striking resemblance at times to psoriasis and syphilis. On the other hand, we are pleased to see that the author has included a description of the cutaneous manifestations of the eruptive fevers.

In reference to the subject of differential diagnosis, too much stress is laid upon the value of the history of the case ; this, although occasionally of great assistance, is more frequently apt to be misleading. The diseases of the skin are few which cannot be diagnosticated from a study of the objective symptoms alone. In this connection the accompanying chromo-lithographic plates may be referred to. We can, unfortunately, mention them only to condemn. With one or two exceptions they are not only useless but confusing. Take, for instance, the two plates intended to show eczema of the hand and sycosis. The former is unique in that it represents no known disease ; the latter is misleading, conveying the idea of eczema or syphilis rather than sycosis. This latter disease limits itself, as the author states in the text, to hairy parts, especially of the face, and yet this plate fails to corroborate the text. Unless such plates are well executed they are worse than useless, reflecting alike upon both author and publisher.

Coming to the subject of treatment, we regret to say we are disappointed. Dr. Shoemaker's claims to recognition in this department of medicine certainly must rest upon his reported therapeutic investigations, and we had hoped to realize some of the advantages of his work, but we cannot avoid the conclusion that this part has been hurriedly written. Take, for example, the diseases acne and acne rosacea. The author gives extended consideration to medicaments whose action is, in the experience of others at least, not at all certain, while such well-known and exceedingly valuable external applications as sulphur and its compounds are given a subordinate place, and the statement added that their use is only exceptionally resorted to. The work contains, however, reference to all the remedies recently introduced in this branch of medicine.

The publishers are to be congratulated upon the excellent general appearance of the volume.

DISEASES OF MAN: DATA OF THEIR NOMENCLATURE, CLASSIFICATION, AND GENESIS. By Jno. W. S. Gouley, M.D., Surgeon to Bellevue Hospital. New York: J. H. Vail & Co. London: H. K. Lewis, 1888.

This book is a plea for a better nomenclature of disease. It contains a summary of the progress of nosography since its foundation. Synopses of Sauvage's, Cullen's, Parr's, Good's, and Delorme's arrangements of diseases, with comments ; also a chronological list of the works on nosology that have appeared from the time of Felix Platerus to the present, and the author's suggestions for an improved classification. Section V. contains a "Review of the Morbid States and Morbific Processes,—the Bacteria, Ptomaines, Leucomaines, and Extractives."

"Of all scientific nomenclatures medicine is confessedly the most deficient," is the author's comment upon the various systems and vagaries which unite together to form our present nosonomy. The naming of diseases from their discovery is considered a pernicious habit. But how, we ask, can a physician perpetuate his memory and the memory of his work better? What better monument for Bright than Bright's disease, or for Graves or Pott than the diseases named after them?

Even names of regions of country are objected to by our author. The Barbadoes leg gives him a shudder, and the play of fancy in such names as "Lupus" and "St. Anthony's fire" calls down his reprobation. Who would care for a country whose name was No. 1 or No. 2, and whose subdivisions were designated by the letters of the Greek alphabet? The author would adopt, perhaps, a classification modelled upon botanical nomenclature, families, branches of families, classes, orders, generas, species, varieties, and he gives us

many new names as his ideals of what diseases should be called in the future. The man of the next century will have "hypoæmia;" not the hypoæmia of the oculist, but a "decrease in the whole quantity of the blood." Iron may even in that future age cure him of this disorder, but what shall he take when he gets, as he may if Dr. Gouley has his way, a real bad attack of "hypoerythrocythæmia?" If he has too much "blood-albumen," he will suffer from "hyperleucontæmia;" and if his blood gets too red, "hyperchromatæmia" will be about the size of his disease. Even when recovering, when his red blood-cells are increasing, he will have "hypererythrocythæmia," and may die convalescent, merely from finding out the name of his condition. Still, there seems to be no other way of naming the newly-discovered conditions which advanced medical science is bringing daily to light. It may seem cumbersome, but the organic chemist has had to do it, and already his nomenclature requires something less than a volume for each name; but we must keep these awful names from our patients, and only speak them under our breath. In fact, it will be difficult to do otherwise. Only the long-winded will be able to announce the result of a consultation to the anxious relatives and friends. For us of the present day it may make the thought of death more pleasing, knowing that if we hurry up, the hard-worked and conscientious physician will be able to certify the cause of our disease without consulting the medical lexicon or exhausting a ream of paper. E. W. W.

CYCLOPÆDIA OF OBSTETRICS AND GYNÆCOLOGY. Vol. XI. STERILITY; DEVELOPMENTAL ANOMALIES OF THE UTERUS, by P. Müller, M.D., etc.; and THE MENOPAUSE, by E. Börner, M.D., etc. With fifty fine wood engravings. Edited by Egbert H. Granden, M.D. New York: Wm. Wood & Co., 1887.

Sterility, the author tells us, even at the present time, renders many a marriage a union of discord, and the sterile wife is considered by many people as an inferior being. What the ancients thought about it we may learn from his "Historical Retrospect." In certain ranks of life, at the present day, in civilized countries, many may deem the sterile blessed, and many certainly covet a practical sterility; but it may be doubted whether even the extreme votaries of society, to whom child-bearing seems intolerable, do not some time or other have the desire for children, in its highest degree, at a time, perhaps, when nature, outraged and relentless, forbids its possibility. Certain it is that when actual sterility exists, then in most cases arises a desire, as so often, for the thing that is impossible, because it is impossible. Cases of this sort will weary the physician and gynæcologist, and submit to any amount of suffering at their hands in the hope of cure. Another large class of clients is derived from families where an heir is an imperative necessity, and in these cases even the otherwise repugnant proceedings of artificial impregnation will be submitted to cheerfully.

With cases of absolute sterility the physician can do nothing. Unfortunately, these are recognized generally only by the failure to conceive, after all the resources of science are exhausted; but there remains a large class where the condition is dependent on removable causes. For the relief of these a thorough knowledge of the subject is necessary, and a text-book like the one before us is invaluable and practical.

The author of this work has gone into his task thoroughly and carefully, and discusses the whole subject in an easy and scientific manner. Male sterility and impotence receives the attention which it deserves, and, after reading the book carefully, it seems to us that there is very little left to be said or advised until the rapidly-progressing scientific research of the day has brought to light new facts and new material. The latter part of Section I. is devoted to "Developmental Anomalies of the Uterus," an allied subject. Section II., on "The Menopause," contains a mass of useful information. The author confirms the observations of Krieger, that the earlier the menses appear the later, as a rule, they cease; that the working-woman reaches the climacteric earlier than her wealthy sister; that many pregnancies in rapid succession cause its early cessation. In regard to the first observation, the author explains it by the fact that the normal child-bearing life of woman begins early and ends late. If, therefore, it begins late, it is from that very circumstance abnormal, and, if continuing so, must end early also; but observation he finds difficult from the multitude of exceptional cases. The author's description of the varieties which the menopause may exhibit is full of interest. There are also some cases of late conception given, and considerable discussion of the causes of this condition.

The management of women during the menopause is discussed by the author in connection with his clinical histories, of which

he gives a great number. The book, as a whole, will prove one of the most interesting and perhaps most useful of the series.

E. W. W.

SIX HUNDRED MEDICAL DON'TS, OR THE PHYSICIAN'S UTILITY ENHANCED. By Ferd. C. Valentine, M.D., etc.

New York: G. W. Dillingham publisher. London: S. Low, Son & Co., 1887.

To be always wise, witty, and profound, instructive in six hundred consecutive remarks upon medical topics, is to be more than human. To put each of the six hundred instructive paragraphs into the form of "don't," without having some intricate and involved sentences, and sometimes a doubtful meaning, is a herculean task. The author of the "noble six hundred" has done fairly well, however, and one who never goes against his advice will be considered a man of extreme tact and science by all who know him. Some of the "Don'ts" are trivial, some involve questions of deep importance. "Don't speak of your physician as an allopath" is an example of the one sort. "Don't ask your physician to fix a date for your recovery" of the other. Some are ironical when applied to most of the busy world, as, "Don't live in a crowded quarter of the town," "Don't wear a stiff hat." Some are dubious in their value, as, "Don't smoke immediately after meals," when the inference is that some other time is better, which is doubtful, and "Don't believe that eating fat will make you fat; quite the contrary," which is more doubtful still. Some are quite impossible for the average man to carry out, owing to the force of some laws of nature which are still active, as, "Don't fall in love without previously ascertaining whether the object of your affections has descended from people of perfect moral and physical character." Judging by the world in general, and the slight difference between what we say and what we do, the author of the above probably eloped with his wife, if he have one, after a few minutes' acquaintance.

To the long list of "Don'ts" the author would probably like the reviewer to say, "Don't omit buying and reading 'Six Hundred Medical Don'ts'," but the reviewer is discreetly silent. E. W. W.

OPERATIVE SURGERY ON THE CADAVER. By Jasper Jewett Garmany, A.M., M.D., F.R.C.S.

New York: D. Appleton & Co., 1887.

The study of operative surgery upon the dead body cannot be urged too strongly, and in most of our medical schools it is now part of the regular course of instruction. We wish it was in all. Admitting, as we must, that operations upon the cadaver are not perfect facsimiles of those upon the living body, yet their resemblance is so close that one who is able to successfully achieve the former may reasonably expect to succeed in the latter. Indeed, we believe no conscientious surgeon would ever undertake to perform any important surgical operation without previously going over the same on the dead subject.

The above work of Dr. Garmany, we think, supplies a want; not that the same information could not be obtained elsewhere, but in that we have presented to us, in a convenient and easily comprehensive form, just such instruction necessary for the student, when working in the dissecting-room, and a ready reference for the surgeon, where time will not permit a study of the case. J. H. C. S.

PHYSICIAN'S AND STUDENT'S READY REFERENCE SERIES. OBSTETRICS SYNOPSIS. By Jno. S. Stewart, M.D. Illustrated.

Philadelphia: F. A. Davis publisher, 1888.

This is a very concise, plain, and useful little compend, good for students, not bad for practitioners who are rusty, and appears in very neat and attractive form. It is really in its make-up just what a book should be, and so many books are not. The illustrations are good, and the general treatment of its subjects fully up to the advanced knowledge of the day. E. W. W.

THE PHYSICIAN'S LEISURE LIBRARY, NO. 1. THE DIAGNOSIS AND TREATMENT OF HÆMORRHOIDS, WITH GENERAL RULES AS TO THE EXAMINATION OF RECTAL DISEASES. By Chas. B. Kelsey, M.D.

Detroit, Mich.: Geo. S. Davis, 1887.

This is an extremely useful and practical book. The author is progressive and experimental, and has tried carefully all ways of treatment. Especially valuable are his directions for rectal examination, and there are few who will not learn much from reading his detailed account of his method. By following his directions, imitating his thoroughness of examination, and treating diseased conditions as he advises, many an obstinate case, the dread of the medical attendant, and the source of both mental and physical agony to the patient, can be speedily relieved. Especially interesting will be found the author's study of the treatment of hæmorrhoids by the injection of carbolic acid,—a method which we believe he was the first to make public, and which he has tried with the varying suc-

cess described in the present volume. Those who remember his early publications on the subject, and who were led by them to place unbounded faith in the carbolic acid treatment, would do well to read this book, in which he freely and frankly gives us his subsequent experience, which has caused him to view the method in a somewhat different light, and while still considering it of great value, to be less certain of brilliant success.

E. W. W.

AN INDEX OF MATERIA MEDICA, WITH PRESCRIPTION WRITING, INCLUDING PRACTICAL EXERCISES. By Chas. H. May, M.D., etc, and Chas. F. Mason, M.D.

New York: William Wood & Co., 1887.

This very little book is one of the series of "Wood's Pocket Manuals," and is intended to present in compact form "information that is not usually found, and certainly not in compact form, in the larger treatises on materia medica and therapeutics." It embraces many non-officinal but extensively used drugs. The book is interleaved, and is intended for the use of students, but may be employed by any one to great advantage in jotting down on its blank pages any facts concerning the uses of the various drugs and preparations which may occur in his experience, or be met with in his reading; in short, as a suggestive note-book of therapeutics.

E. W. W.

## Correspondence.

### BERLIN.

(From our Special Correspondent.)

At the last meeting of the Medical Society of Berlin, Dr. Liebermann, a professor of chemistry, delivered a lecture, entitled "Therapeutic Substitutes for Chrysarobin." The address was in many points most interesting as well as instructive. It was Professor Liebermann who, twenty years ago, discovered that chrysophanic acid, which Attfield described as the active principle of goa powder, was a secondary product, and that it was derived from a primary product, to which he gave the name of chrysarobin. The most prominent property of chrysarobin is its rapid oxidation. An alkaline solution of chrysarobin when exposed to the air will absorb oxygen with great rapidity and be transformed into chrysophanic acid. At that time Liebermann was of the opinion that the curative properties of goa powder were not due to the chrysophanic acid which it contained, but to chrysarobin. He argues that the chrysarobin contained in goa powder, by means of its great attraction to oxygen, robs the parasites of certain skin-diseases which it comes in contact with of the oxygen necessary for their existence. Years ago Liebermann suggested that comparative experiments should be made with chrysarobin and chrysophanic acid, but as yet nothing has been done by our otherwise active experimenters. Farisch has, indeed, made experiments upon the subject, but in quite a different direction. It has been his aim to find a suitable substitute for chrysarobin. Alizarin was tried, but proved to be valueless. Pyrogallic acid, however, was found under certain circumstances to be capable of ably replacing chrysarobin. Farisch viewed the subject from the following point: Chrysarobin and pyrogallic acid are both phenols of a high order, and the alkaline solutions of pyrogallic acid are similar to those of chrysarobin in their property of absorbing oxygen with very utmost rapidity.

Recently Liebermann has again taken up the subject, and gone through a series of very complete experiments. These researches were carried out last summer. They at first resulted, upon the reduction of chrysophanic acid into chrysarobin (the opposite to what had been done before), in confirming Liebermann's previous experiments relative to the therapeutic action of chrysarobin. The thought immediately arose of the possibility of various substances, which are related to each other as chrysophanic acid to chrysarobin, having a similar therapeutic value. It was his desire to find a substitute which might be prepared in large quantities, without any technical difficulty and without great cost. He chose two such substances as a base for his experiments which bore a similar relation to each other as chrysarobin and chrysophanic acid. They were *alizarin*, which is a well-known coloring-matter, and a derivate from it, to which Liebermann has given the name of *anthrarobin*. The last-named substance is identical with chrysarobin in its property of actively absorbing oxygen, and in a short time it again changes into alizarin. After Liebermann had discovered an easy technical method of producing, or rather preparing, anthrarobin, Dr. Behrend, upon his suggestion, also engaged in experimenting with the drug. The experiments proved that anthrarobin was analogous to chrysarobin in its therapeutic actions, whereas alizarin, as had already been proved by Farisch, con-

tained no similar properties. In this fact Liebermann recognizes a therapeutic principle of great importance. To substantiate this, however, the finding of this *one* substitute was not sufficient. Similar action ought to be contained in a series of substances belonging to the same group, and the one discovery ought to open a way for the finding of numerous bodies, all of which ought to be able to replace chrysarobin.

Regarding the therapeutical uses and value of anthrarobin, it is a yellowish-white powder, of a rather coarse description. It is soluble in a small quantity of water; also soluble in ten parts of glycerin at a temperature of 100° C. Soluble also in ten parts of alcohol when cold, and in five parts of alcohol when the latter is boiling. When rubbed up with oil it may be easily made into a salve. In the experiments of Dr. Behrend a ten per cent. salve was used, and occasionally even a twenty per cent. salve, a ten per cent. tincture, and also a ten per cent. solution in glycerin. In all these different forms it was borne remarkably well, no symptoms of inflammation or irritation being caused. Indeed, the drug was rubbed into the face and even eyelids for weeks without causing any perceptible irritation or giving rise to any inflammation. The only unpleasant symptom which accompanied its use was the discoloration of the skin upon which it was used. It caused a yellow stain. Apart from a slight sensation, burning was sometimes observed to follow the first application. In some cases this sensation passes off in a few minutes, while in others it lasts for half an hour to two hours, yet it never reaches any degree of intensity, and was so slight that even children bore it without murmuring.

The drug was used by Dr. Behrend in those diseases in which the application of chrysarobin could possibly have been attended with good results, and in all such cuticular affections in which chrysarobin is generally used,—viz., psoriasis, herpes tonsurans, pityriasis versicolor, and erythrasma. The salve or tincture was well rubbed into the skin, the loose flakes of epidermis having been previously removed. The action was considerably augmented if the affected parts had been previously washed with soap or saponaceous spirits of potash. The action of anthrarobin is slower than that of chrysarobin, but much more intensive, however, than that of pyrogallic acid, which is so often used to replace chrysarobin, and the disagreeable accompanying symptoms of the latter render its use impossible in certain cases.

The slowness of the action of anthrarobin, and the long use it requires before satisfactory results are reached, is more than balanced by the manner it is endured and tolerated even by the most sensitive subjects. Further, the price of anthrarobin is about one-third as cheap as that of chrysarobin and pyrogallic acid.

These reports of Dr. Behrend were confirmed by Dr. P. Guttmann, who had also had an opportunity of investigating the value of anthrarobin in a series of cases. His observations are in the main identical with those of Behrend, and his results equally satisfactory. Dr. Guttmann quoted one case especially where the characteristic properties of anthrarobin were observed in comparison with those of chrysarobin. The patient, who for two years had been suffering from psoriasis, which implicated the whole surface of the body, applied on his right arm for five days a ten per cent. salve of chrysarobin, and simultaneously applied a twenty per cent. salve of anthrarobin to the left arm; also for four days the left leg was rubbed with a twenty per cent. alcoholic solution of anthrarobin. At the expiration of the five days the right arm had entirely healed, and the disease disappeared,—that is, no new skin-flakes were being formed. In the left hand the disease had also began to disappear, but the results were not so complete as in the right arm. The leg was in the same condition.

Regarding the subject of our last letter, *erythrophlæine*, we are now able to report further results with this interesting drug. Some of the latest investigators speak highly of the anæsthetic. P. Guttmann used it upon fifteen different patients in twenty-four single experiments. Of these, eleven were suffering from pain of various causes, but principally of neuralgia, and others from chronic inflammations. The drug was used in subcutaneous injections of a watery solution, the strength being 1 to 1000 or 1 to 2000.

In four cases, granulating wounds were washed, or rather painted, with a solution of the drug. The drug acted promptly after injections of $\frac{1}{200}$ to $\frac{1}{100}$ of a grain, the effect being complete in twenty-five to thirty minutes, and in some cases even sooner, seldom later. When given in the above-named minute doses the effect of the drug will not pass off for several hours. When larger doses are given, say from $\frac{1}{100}$ grain upwards to $\frac{1}{50}$ or $\frac{1}{40}$ grain, or, at the very most, never more than $\frac{1}{32}$ grain, the pain-stilling effects of the drug will last for six or eight hours. The

action of the drug is not immediate. After the injection a sensation of burning is frequently experienced, which lasts for about an hour, sometimes even longer. This accompanying symptom is not, however, a serious one, and patients suffering great pain give it little or no attention. Aside from this, infiltration of the tissues surrounding the place of injection was sometimes observed. This, however, disappeared of itself. In those cases where the drug was applied to the surface of granulating wounds its action was not satisfactory until $\frac{1}{12}$ grain had been applied. When given hypodermically in two cases a slight anæsthesia was observed at the spot of the injection. A true or complete anæsthesia of the skin did not take place upon hypodermic use of the drug, or at least the anæsthesia so produced was so slight as to be unworthy of mention.

According to the observations of Goldschmidt, a few drops of a one per cent. solution dropped into the eye caused in fifteen minutes a complete anæsthetization of both the conjunctiva and cornea. With the exception of a slight irritation, and a sensation of burning or heat, no unpleasant symptoms were observed to follow its use. When the eye was already inflamed, severe burning was complained of, but even this disappeared as soon as the anæsthesia had supervened. Two cases of extraction of pieces of iron from the eye, and one case of division of the lachrymal canal, were performed after the drug had been applied, and its anæsthetic properties proved to be both trustworthy and complete.

The experiences of another Berlin oculist are not so flattering. Dr. Guttmann reports of a case in which he dropped 2 drops of a .2 per cent. solution of erythrophlæine into the eye in order to remove a foreign body from the cornea. In half an hour anæsthesia occurred, and the foreign body was removed with similar results as would have attended the use of cocaine. But the next day an intense white cloudiness of the cornea was observed, the cornea was still entirely anæsthetized. This condition lasted four or five days. Even after a week considerable anæsthesia of the cornea existed, and not until eleven days after the operation did the cloudiness disappear, and even after two weeks a slight spot was observed in the centre of the cornea, and this spot proved also to be without feeling.

From Vienna we have received an account of a series of unsatisfactory experiments with erythrophlæine, and therefore its future, as we said in our last letter, does not look especially bright; still less so, as we are already in the possession of a local anæsthetic (cocaine) which at all times can most ably take its place.

In my next letter I hope to be able to give you an account of the Seventh Congress for Internal Medicine, which takes place during April in Wiesbaden. Among a list of articles to be read at the Congress I notice one on the therapeutics of cardiac diseases, by Dr. Oertel, of Munich. During the week prior to the Congress the Surgical Congress of Berlin will hold a commemorative festival in honor of the Nestor of German surgery, Bernhardt von Langenbeck.

BERLIN, April, 1888.

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## PARIS.

(From our Special Correspondent.)

The event of the month has been the utter demolition of Dr. Luys's theories on *therapeutics from a distance* (thérapeutique à distance). Last summer, it will probably be remembered, the doctor astonished his fellow-academicians with a striking discovery he had made respecting the effects of medicines on hypnotized subjects, without actual contact with the patient. For instance, he related (see the THERAPEUTIC GAZETTE, October, 1887, page 713) how he had sent a patient into convulsions with a solution of strychnine, made another tipsy with a drachm or so of brandy, etc., although the vials containing the liquids had only been brought close to the head of the subject. If Dr. Luys had no other success, he certainly succeeded in amazing the Academy of Medicine, a body usually but little inclined to wonder, and at his request a committee was appointed to investigate the supposed discovery. Although no one doubted the learned gentleman's good faith, experiments made by independent inquirers soon threw considerable doubt on the correctness of his deductions. But the report of the academy committee, presented last week, has effectually settled the question, it is hoped. The committee, composed of Drs. Hérard, Bergeron, Brouardel, Gariel, and Dujardin-Beaumetz,—the last being charged with the presentation of the report,—carefully examined the question, took pains to avoid all sources of error, and treated the subject in a thorough scientific manner. Perhaps so much precaution may seem unnecessary; but it must be borne in mind that Dr. Luys is a man highly esteemed, and that he was neither the first nor

the only one to advocate the theories in question. Books and pamphlets, widely circulated, have been published on the subject, hence it was necessary to avoid all semblance of prejudice or arbitrary reprobation, to prevent the spreading of the delusion, as many absurdities of our period owe their popularity to a sort of apparent martyrdom of their originators. But to return to the academy committee, Dr. Luys was, at a first sitting, requested to repeat before them the experiments described in his memoir, and this he did, taking for his subject the young woman, Esther by name, who had before shown such sensitiveness, when hypnotized, to the medicinal tubes. The performance succeeded as well as ever, and need not be described in its details. But at the next sitting the crucial test began, and was continued during two other subsequent meetings. Sixteen tubes had been prepared by M. Vigier, a pharmacist, not present at the experiments, and by him simply marked with numbers corresponding to sealed envelopes in which the true name was inclosed. Ten of the tubes, or homœopathic vials, exactly like those employed by Dr. Luys, contained each ten grammes of a medicinal solution; six tubes, covered with white paper, held various powders; and, finally, one empty tube, similarly covered, was added by the committee. Esther having been hypnotized by Dr. Luys, the tubes were brought into play as formerly, but the committee avoided the error of outside experimenters who had named in the hearing of the patient the effects expected from each drug. If the theories were correct the patient should be able to show the characteristic symptoms without any suggestion. But, alas! Esther went all astray. The first thing to strike the committee, before opening the sealed envelopes, was the similarity of effects observed with all the vials,—the application of the tube to the left side of the occiput causing symptoms of terror, sorrow, and repulsion, while to the right side, laughter, joy, and satisfaction resulted. Another point also impressed the committee,—namely, the action of the empty tube. The effects were remarkable, and even more intense than any obtained from most solutions. When placed on the left side the whole corresponding side became contracted, the contraction soon extending to the entire body. When brought before the eyes the tube caused the patient such terror that she rose and pushed back her chair violently. The same effect occurred with the vial on the right side of the neck. When in front of the neck, swelling of the thyroid gland, congestion of the face, and apnœa were produced. Dr. Luys tried to explain such untoward symptoms by attributing them to the sheen of the glass, but the committee replied that the other vials were just as shining as the empty one, if not more so. The report detailed at great length the symptoms observed with each particular medicine. Suffice it to say, that the same vial afforded completely different results at different sittings; that three of the tubes which, unknown to the committee, contained distilled water affected the patient diversely; and, finally, that the symptoms observed had no relation with the known effects of the drugs contained in the tubes. Therefore the committee, while fully acknowledging Dr. Luys's good faith, proposed that the following resolution be unanimously adopted by the academy:

"The committee appointed by the Academy of Medicine to examine the facts brought forward by Dr. Luys at the meeting of August 30, 1887, in regard to the action of medicaments from a distance on hypnotizable subjects, give it as their opinion that none of the effects observed by the committee agree with the nature of the substances experimented with, and that therefore neither therapeutics nor legal medicine need take such effects into consideration."

Which report was adopted.

The *poisonous action of preserved foods* is a topic of no little importance, both to America, which prepares most canned meats and vegetables, and to Europe, which consumes them. The problem has already occupied the attention of chemists of both continents, but Dr. Poincaré has handled it from a different stand-point, that of the biologist, and thus contributed instructive new facts towards the elucidation of a complicated question. Suspecting that poisonings from preserved food are more frequent than is commonly believed, the eminent professor of the Nancy Faculty of Medicine limited himself to direct experiments on living animals and microscopic examinations bearing especially on microbes and micro-organisms in general. The results arrived at were, in substance, as follows:

1. *Direct Poisonous Effects.*—When ingested into the stomach the various sorts of preserves, even after six months' exposure to the air and then in full putrefaction, never caused death, but only sickness ending in vomitings and more or less severe diarrhœa. At the same time too much importance should not be given to this immunity of animals, as the human stomach is not so robust. When injected sub-

cutaneously, however, preserves proved very injurious. The experiments, made with macerations effected under different conditions, and with thirty-five sorts of preserves, had for a consequence forty-eight deaths out of one hundred and forty-six injections, or very nearly one-third of the subjects. A singular fact noticed was, that while preserved animal food gradually became less virulent on air-exposure, although putrefaction manifestly progressed, vegetables grew to be poisonous in time which had been harmless when the cans were opened. Taken all together, fish proved the worst of all, having from the start secured a score of five deaths out of six inoculations. Such of the animals as recovered were not without paying a tribute to the inoculation in the shape of huge abscesses, loss of hair, etc. But it is unnecessary to enter into further particulars in this direction, although it must be remembered that the persons who open and handle preserve-cans are just exposed to involuntary self-inoculations of the sort. Another deduction that may be drawn from the experiments is that all vegetable preserves, as a rule, are harmless when freshly opened.

2. *Physical Alterations of Preserves.*—Most of them have undergone a commencing modification, even before they are opened. In meats the muscular fibres have partly degenerated and turned to the greasy-granulous or vitreous state. In fishes, especially, quantities of crystalline masses are observed which are soluble in ether, and therefore probably of a fatty nature.

3. *The Microbian Life in Canned Food.*—All preserves were found, at the time they were opened, to contain enough microbes to easily yield appreciable quantities of them on simple washing with distilled water. The microbes were generally in motion from the start, but in all cases they soon began to move, a proof that Appert's process of preserving, adopted in America as well as in Europe, causes at most the apparent death of the microbes, but does not interfere with their aptitude to start on a new life accompanied with probable virulence. To compare the foods together, fish contains more microbes than either bird or mammifer flesh, and meat more than vegetables, sour-crout being of all vegetable preserves the most densely populated with microbes, and pineapples, asparagus, and carrots the least. The varieties of microbes are considerable, and very changing according to time or circumstances, and range from the bacilli, filaments, etc., to the micrococci, bacteria, vibrios, etc.

4. The results of the cultivation were in all cases negative. Although microbes multiplied, and putrefaction set in, the injections remained without effect.

5. The blood of animals succumbing to the injections of what may be called the mother-watery tincture of preserves was always abnormal, various deformations of the corpuscles being apparent, and numbers of micrococci developing in the blood-serum, together with bacilli.

6. *Chemical Poisons.*—Leaving aside mineral poisons, too often found in canned goods, the discordance between the number of microbes and the toxic properties of the products suggested the possible presence of ptomaines in some of them, the alkaloids being due to either ordinary decomposition or to the microbes themselves. Although too much importance should not be attached to a negative result, no ptomaines were found, a fact showing that these substances are not the only poisonous principles to be found in decaying food-materials.

The conclusion to be drawn from the foregoing is that canned food should not be kept too long, and that it is apt to be dangerous, even when free from mineral poisons and apparently in a good state of preservation. It is not a condemnation, but a caution to be careful. In fact, the question is one with many sides, and one side that needs investigation is the state of the food-stuffs themselves before they are preserved. Stale meats and vegetables will not improve because they have been boiled in a tin can and labelled with a fine chromo.

Porcine pneumo-enteritis, *alias* hog-cholera, has made its appearance in France, where it was brought apparently from Algeria. Drs. Cornil and Chantemesse, two well-known bacteriologists, are now investigating the guilty microbe with a view to devise a mode of vaccination that will render pigs cholera-proof. Their preliminary examinations have shown the microbe to survive long desiccation and freezing, and to live and multiply in plain distilled water. Such antiseptics as saturated solutions of ferrous sulphate, zinc chloride, picric acid, lime-water, carbolic acid, and salt have but little effect on the virus. Corrosive sublimate, in solutions of one per mille, which sterilizes the microbe-cultivations obtained on the potato, acts but imperfectly when in contact with animal substances, owing to the protection afforded by albuminoids. The best antiseptic solution is the following :

Muriatic acid, 2 parts;
Carbolic acid, 4 parts;
Water, 100 parts. M.

The liquor will sterilize in less than one minute all cultivations of the microbe. Thus one point has been gained; to attain the next,—namely, a vaccination effective against hog-cholera,—MM. Cornil and Chantemesse are now raising crops upon crops of pneumo-enteric microbes, cultivating—or breeding—them for their experiments. So far they have only been dealing with cheap guinea-pigs and rabbits, but as soon as they are well prepared they will try their hand on the expensive and valuable animal, the hog.

*Ambulances for Paris.*—Dr. Nachtel, who did so much a few years since for establishing a night medical service in New York on the Paris plan, is now returning the compliment, and introducing here the ambulance service, so well understood in American cities. No opposition was ever made to the innovation; every one considered the idea excellent; but in all administrations there is always a certain *vis inertiæ* requiring some force to overcome it. Now, however, the system has received official sanction, and twenty-seven signaling stations are connected with the Hôpital St. Louis, whence ambulances will be ready to start at a moment's notice. The funds so far collected by Dr. Nachtel are sufficient to give the plan one year's trial, and it is considered certain the Paris municipality, or the people at large, will not let the thing drop when they have experienced its convenience and usefulness.

A Parisian pharmacist has been playing an ugly practical joke on one of his London brethren. Finding himself in Tottenham Court Road, hardly pressed by a certain need that can be eased in Paris in any of the numberless ornamental columns provided by a paternal municipality, he took a mean advantage of his knowledge of the brotherhood's habits. He went into a chemist's shop, pretended to be suffering from incipient diabetes, and to have been ordered by his physician to get frequent analyses made by competent chemists. Whereupon he left a copious specimen with the smiling Londoner, and was seen no more. Such mean action, although base enough, is to a certain extent excusable, but the villain had the impudence to boast of his feat in the French papers, and to crack jokes at the expense of John Bull. To be sure, the story is, after all, trifling, but trifles often carry a moral with them, which, in the present case, applies to other large cities than London.

PARIS, March 24, 1888.

*NITROGLYCERIN IN TUBAL NEPHRITIS.*

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—Permit me to call the attention of your readers to the use of nitroglycerin in tubal nephritis.

My attention was first called to the use of this remedy in the above affection in the year 1880 by Dr. Jackson, of Tottenham, England. Since then I have used it in a number of cases, and *always* with benefit. In every case there has been present fever, dropsical effusion, albuminous urine, and tube-casts.

I use a solution of 1 to 100 of absolute alcohol, and give 5 drops in water at a dose every three hours.

W. JOHN HARRIS, M.D.

ST. LOUIS, MO., March 24, 1888.

## Notes and Queries.

*THE PROFITS OF VACCINATION.*

The anti-vaccinationists are very hard up for arguments. This should induce us to be somewhat merciful to them. Otherwise the absurdity of their propositions and the meanness of their suggestions might tempt us to treat their statements with contempt. One of the pet statements of anti-vaccinationists is that medical men support the vaccination laws because they profit by them. Few statements could be more misleading. The great majority of medical men lose in every way by the vaccination laws. First, they lose by the arrangements for public vaccination. The vaccination authorities select one man out of a large district to vaccinate. He takes away for this purpose the patients of other medical men. Such an arrangement is satisfactory to the man selected; but only men with an anti-vaccination twist of mind can conceive it to be satisfactory to others,—that is, to nineteen out of twenty. So much for medical men whose practice is among the poor. As for those who practise among the rich, their demoralization is complete, according to a writer in an evening contemporary. When a real or rumored case of smallpox occurs in the neighborhood of a public school "the doctor and the master *affect to be alarmed*," and, as a precautionary measure, all the boys are revaccinated. The master does not get all the money, and at a convenient interval the operation is repeated. Such is the argument. Doctors do not "affect" to be alarmed when smallpox is in

the neighborhood of a public school or reported to be; they are really so. They would be guilty of something like manslaughter if they did not revaccinate all who had not been revaccinated. If Mr. Young will favor us with any single case in which a boy once successfully revaccinated at a public school has had the operation repeated in the school period we shall feel obliged to him. It is not by such statements, as reckless as they are rude, that the operation of revaccination is to be discredited. As regards the profit accruing to the doctor, it is a mere pittance compared with that of attendance on smallpox cases which the neglect of vaccination and revaccination infallibly bring to the profession. Parents, in London especially, just now know something of the money cost of a virulently infectious disease in the family, to say nothing of death risks,—fifty pounds per case, including nursing, disinfection, loss of business, destruction of bedding, etc.,—is a moderate estimate. Smallpox is not less costly than scarlet fever.—*Lancet*, April 7, 1888.

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*PENNSYLVANIA STATE SANITARY CONVENTION*

AT LEWISBURG, UNION COUNTY, PA.

To be held under the auspices of the State Board of Health, Thursday and Friday, May 17 and 18, 1888.

PRELIMINARY ANNOUNCEMENT (subject to amendment).

FIRST DAY.—Opening Address, by his Excellency the Governor of Pennsylvania; Address of Welcome, D. J. Hill, LL.D., President of Bucknell University; "The Prevention of Contagious Ophthalmia," Dr. P. N. K. Schwenk, of Philadelphia; "Diseased Meats and the Prevention of Trichinosis," Dr. G. W. Fury, Sunbury, Pa.; "The Water-Supply of Lewisburg," Professor W. G. Owens, Bucknell University.

*Evening Session.*—Annual Address, Hon. S. T. Davis, M.D., Lancaster, Pa.; "Cremation as a Means of Disposal of the Dead," Dr. B. F. Hyatt, Lewisburg, Pa.

SECOND DAY, 9 A.M.—"Smallpox in Country Places," Dr. Fetterolf, Mazeppa, Pa.; "Hygiene of the Teeth," Dr. H. Gerhart, Lewisburg, Pa.; "Insanity among Women," Alice Bennett, M.D., Resident Physician, State Hospital for the Insane, Norristown, Pa.; "Sanitary Protective Associations," Benjamin Lee, M.D., Secretary of the State Board of Health; "Sanitary Shortcomings of Lewisburg," Dr. W. B. Atkinson, Secretary of the Pennsylvania State Medical Society, and Medical Inspector to the State Board of Health.

SECOND DAY, 2 P.M.—"School Hygiene," Dr. G. G. Groff, of Lewisburg, member of the State Board of Health; "Household Hygiene," Professor Frances Emily White, Women's Medical College, Philadelphia, Pa.; "How Germs cause Disease," Dr. V. C. Vaughan, of Michigan University; "The Drainage of Lewisburg," M. S. D. Bates, Lewisburg, Pa.

*Evening Session.*—Illustrated Lecture, Dr. Edwards, of the State Board of Health. Papers are also expected from Dr. J. H. Kennedy, Shamokin, Pa., Dr. A. Schultz, Superintendent of the State Hospital for the Insane, Danville, Pa., and other distinguished scientific men.

It will be observed that, while distinguished sanitarians from a distance will take part in the proceedings, the aim has been to make the latter to a considerable extent of practical use to the citizens of Lewisburg and its neighbors, and to enlist them in the study of its sanitary problems. For this reason they will be of great interest to all residents in small towns and rural districts, the conditions of which are necessarily very similar.

The Convention will be presided over by the Hon. S. T. Davis, M.D., member of the State Legislature, of Lancaster, Pa.

A more definite programme will be issued later.

GEORGE G. GROFF, M.D., }
BENJAMIN LEE, M.D., *Sec'y*, } *Committee.*

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*THE VALUE OF COLD BATHING.*

The use of cold water for bathing purposes is a time-honored institution in many, if not in all, countries. Though necessarily limited in its application by considerations of convenience, it is probably nowhere more highly appreciated than in the British Isles. Respecting its value as a bracing general stimulant in suitable cases there can be no question, and the difference in this particular between its influence and the depressing effect of frequently repeated warm bathing is obviously a point in its favor. The sharp and transient shock of cold is doubly beneficial. It clearly acts not only as a stimulus of the circulation, constricting for the moment the surface blood-vessels, and thus provoking their

after-dilatation, but it is also by the same process an acclimatizer. The risk of chill from sudden changes of wind and weather is manifestly lessened in the case of those whose vaso-motor system has been trained to adapt itself to such movements by the discipline described above. It is true that constitution, state of health for the time being, and age cannot be left out of account, but we shall not err in saying that, given a fair degree of vascular tone, unimpaired by any serious weakness of the heart-muscle, a frequent cold bath rapidly gone through is a tonic as natural as it is beneficial. In beginning the practice it is wisest to choose the summer season, and it may then be continued daily or on alternate days throughout the winter. A correspondent who has been in the habit of thus refreshing himself during the past ten years informs us that, though neither young nor robust (his age is 50), he has enjoyed a dip every other morning even in the depth of severe winters. He experienced apparently equal benefit whether he selected, for a given season, his bath, the sea, or a fresh-water lake as the scene of his ablutions. He is naturally a strong believer in cold bathing. It is not necessary even for all *bona fide* bathers to follow his plan in detail, but his general rules are worth observing. These are,—to take a rapid dip, say one which occupies three or four minutes, to bathe on alternate days, to be well warmed with exercise before immersion, and to keep up the glow after it. The directions are excellent. In order to follow them out with benefit a robust physique is not necessary, at all events for bathers in-doors; but at least an average degree of vascular tone is.—*Lancet*, April 7, 1888.

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### *ALPHA-NAPHTHOL.*

A few weeks since (*Pharm. Journ.*, December 3, p. 437) a reclamation was put forward in respect to the superiority of beta-naphthol as an insoluble antiseptic and its relatively non-toxic properties.

Alpha-naphthol has now in its turn become the subject of a panegyric by M. MAXIMOWITCH (*Compt. Rend.*, cvi. 366). This compound, like beta-naphthol (from which constitutionally it differs only in the position of the hydroxyl group), is insoluble in cold water; but in water at a temperature of 70° C. it dissolves to the extent of 4 parts in 10,000, the solution being of a violet color. It is readily soluble in alcohol and ether, and in a litre of dilute spirit containing four hundred cubic centimetres of absolute alcohol it will dissolve to the extent of ten grammes. M. Maximowitch has studied the antiseptic value of alpha-naphthol by noting its effects upon fourteen different kinds of microbes cultivated in different media. He found that when added to cultivations in liquids of the bouillon class, in the proportion of .1 part per 1000, it completely arrested the development, among others, of the microbes of glanders, chicken-cholera, and pneumonia, the bacillus of typhoid fever, and the organisms of suppuration, *Staphylococcus albus* and *S. aureus*. For cultivations in gelatin the same proportions were effective, but for agar-agar the dose had to be stronger in some cases. Urine, after being shaken with alpha-naphthol in alcoholic solution or in powder, did not ferment. When introduced into the organism of rabbits, alpha-naphthol was found to be three times less toxic than beta-naphthol and seven hundred times less toxic than mercuric iodide, the toxic dose for a man weighing sixty-five kilogrammes being calculated as 585 grammes. —*Pharm. Journal; American Druggist*, April, 1888.

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### *INSTILLATION OF NITRATE OF SILVER IN THE EAR.*

The following case, reported by DR. T. W. BENNET in the *Lancet* for February 4, 1888, may be of interest on account of the unpleasant results occurring in consequence of the instillation of a solution of nitrate of silver into the ear, since most of the text-books on surgery speak of it generally as being almost painless in its action.

"Mr. F. consulted me in January, 1887. The right ear was the seat of acute inflammation, which rapidly recovered. The left ear was the seat of perforation of two years' duration. The posterior inferior segment had disappeared, together with about half of the long process of the malleus. The membrane of the tympanic cavity was swollen and granular in appearance. I advised the use of solutions of zinc sulphate. Under this local treatment the hearing steadily improved, but the discharge did not stop. After trying other methods of treatment, I dropped into the ear a few drops of a warm twenty per cent. solution of nitrate of silver. Immediately there was intense pain. I lost no time in syringing the ear, but without relieving the pain. The patient suffered extremely for three days, in spite of instillations of cocaine, the insertion of ear-cones of gelatin contain-

ing morphine, and the hypodermic injection of morphine on the second night. On the third day there was absolute deafness, even when the tuning-fork was applied to the skull. The patient complained also of frequent transient attacks of giddiness. In consequence I advised the use of leeches to the ear, and prescribed a mixture containing iodide of potassium. The pain now ceased, but for several days the hearing was almost *nil*, and the discharge continued as before. Two months later the patient consulted me again, and under the use of powdered alum the discharge rapidly stopped, the hearing improving considerably, and the hearing distance for the watch becoming $\frac{20}{60}$ in."

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### *FORMULÆ FOR SALOL.*

The following are some French formulæ for salol, which we quote from the *Bul. Gén. de Thérapeutique:*

1. For burns, as a liniment or application:

℞ Ol. oliv., 60 parts;
Salol, 10 parts;
Aq. calcis, 60 parts. M.
S.—Liniment.

2. With collodium, for fissured nipples:

℞ Salol, 4 parts;
Solve in
Ætheris, 4 parts;
Adde
Collodii elastici, 30 parts.

3. As a dentifrice:

℞ Salol, 3 parts;
Spir. alcohol, 150 parts;
Ol. anisi stellat,
Ol. geranii, āā .5 part;
Ol. menth. piper., 1 part. M.
S.—Tooth-wash.

4. Salol-cotton is prepared by dipping cotton in a solution of equal parts of salol and ether. The ether evaporates and the salol remains, equally distributed in the cotton.

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### *OIL OF PEPPERMINT AS AN ANTISEPTIC AND AS A REMEDY IN PHTHISIS AND DIPHTHERIA.*

In the *Lancet* for March 17 and 24, 1888, Mr. W. Leonard Braddon reports a number of experiments as to the use of oil of peppermint as an antiseptic, in which its power for preventing decomposition seems to be equal if not superior to that of carbolic acid and corrosive sublimate, and while his results are very variable, they certainly seem to prove that the oil of peppermint is within limits of time one of the strongest and most reliable of antiseptic agents. He has likewise used it in practice with excellent results, employing it as an antiseptic in a case of resection of a tuberculous knee-joint healed without any rise of temperature or the formation of a drop of pus, removal of a large sebaceous cyst from the neck, an operation for strangulated hernia, and several minor cases, in which its employment was followed by a freedom from suppuration and without any rise of temperature. For minor operations he employs a preparation of olive oil containing one drop of oil of peppermint in the ounce of oil to soak the lint in. For major operations he uses a gauze prepared like eucalyptus gauze, containing 1 part in 1000. It can be used in any strength, in any quantity, without any ill result to the patient. It should, therefore, be of especial value in abdominal operations. It is readily diffusible, but does not evaporate so speedily as to be rapidly exhausted. The gauze has retained the odor of it for nine months as freshly as when prepared. It is thus superior to corrosive sublimate, which does not come off from the gauze, so as to penetrate all parts of the dressing and the wound; and to iodoform, as its odor does not mask in any way that of any other discharges, as iodoform does. Not less valuable seems a special property it appears to have of checking suppuration, independently of its antiseptic tendency this way. As powerful as, but more penetrating and diffusible than, corrosive sublimate, absolutely harmless to the system in the largest doses, easily attainable, and readily prepared, oil of peppermint thus forms the best, safest, and most agreeable of all known antiseptics.

In addition to being from its potency and other advantages a surgical antiseptic, it would likewise seem from Mr. Braddon's experiences that there lies in the oil of peppermint a power for good and a field for therapeutic utility vaster in extent or importance than any yet known or suspected. In some cases of phthisis it was employed as an inhalation, yet so few in number as to prevent the drawing of positive conclusions, and yet promises the greatest encouragement in the employment of this drug in this affection. Five cases are reported which show that the oil may be inhaled pure for an almost unlimited time without producing any ill effects, and that it has an immediate beneficial effect

in some cases of even the latest stages of galloping consumption, and that early phthisis is at least checked in its progress under its systematic use, and possibly, as would seem from his report of one case, when other circumstances are favorable, be even cured. Two cases of typical diphtheria are likewise referred to in which the pure oil was freely and copiously applied twice daily coincidently with great improvement in the other symptoms, fever departed, and the improvement was so marked as to encourage further trial of oil of peppermint in this disease.

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*DEEP INJECTIONS OF CREASOTE IN PHTHISIS.*

Dr. Rosenbusch gives an account in a Polish medical journal (*Przeglad Lekarski*, February 4 and 11, 1888) of the cases of nine phthisical patients whom he treated by injecting creasote into the tissue of the lung. The results he obtained were excellent. The injections, which were given at intervals of two or three days, caused the cough almost to disappear and the quantity of sputum to diminish. In those cases which were not very far advanced the patients gained flesh, the dyspnœa and sweats ceased, the body weight increased, and frequently spots which had been dull on percussion cleared up. The temperature decreased from five to eight hours after the injections, the fall continuing at first for ten or twelve hours, a permanently normal temperature being subsequently registered. The injections were made into the affected portion of the lung, which was usually, of course, the apex. The instrument employed was an ordinary Pravaz syringe, with a needle from six to eight centimetres in length. About 8 minims (half a syringeful) of a three per cent. solution of creasote in almond oil was injected in each of two spots, the piston of the syringe being pressed down slowly. The patient was told not to breathe deeply, and after the injection to lie quite still for a few minutes. When the needle was not inserted deeply enough, some lancinating pain was apt to be produced by the irritation of the pleura. This, however, did not last long. No hemorrhage was ever observed after the injection, though in the case of one patient, who was subject to hæmoptysis, a slight coloring of the sputum was observed for a short time. If the injections were made into a cavity, or into one of the large bronchi, the patients said they could smell creasote when they coughed, and this substance could be detected in the sputum by chemical means. Of course, great care was taken to perform the operations under aseptic conditions, the skin, the needle, and the syringe being previously carefully washed with an antiseptic. The creasote used was the *creasotum e bitumine fagi*, or beech creasote. The writer promises a subsequent communication on the effect of these injections on the number of Koch's bacilli.—*Lancet*, March 31, 1888.

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*NARCEINE.*

Laborde recommends narceine in whooping-cough. Dose, from $\frac{1}{6}$ to $\frac{1}{4}$ grain for children from 3 to 4 years old. It conduces to sleep and checks the nightly paroxysms of coughing. Brown-Séquard and others endorse the opinions of Laborde.—*Deutsche Med. Wochenschrift*, January 5, 1888.

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*THE TREATMENT OF EPILEPSY BY SIMULO.*

Simulo is the fruit of the Cappariscoriaceæ, a member of the Hyssop family, found in Bolivia, Peru, etc., and has been employed, in the form of a tincture, by Dr. W. Hale White (*Lancet*, March 31, 1888) in seven cases of epilepsy, in doses of from ½ to 2 drachms three times a day. In all the cases considerable improvement is claimed to have taken place, although in none did complete cure seem to be attained. None of the patients complained of any ill effects from the prolonged use of the drug, and it has been given to children without producing any ill effects.

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*THERAPEUTICS WITHOUT ALCOHOL.*

The London Temperance Hospital has been in existence now about twelve years, and the annual report for 1886–87 may be studied with advantage in order to compare the results with those of other hospitals. It must not be supposed that the hospital only receives abstainers, though these are in the majority, probably due to the large proportion of infants and children. In the surgical department the results have been very satisfactory, so far as one is enabled to judge from mere figures; but, turning to the medical cases, we may restrict examinations to one or two groups of disease with advantage. Out of thirteen cases of acute pneumonia four (abstainers) died, one of them on the fifty-fourth day from exhaustion. Only four cases of typhoid fever were

admitted in all, and although the cases were of young people,—15, 7, 14, and 35 respectively,—and comprised three abstainers, they all proved fatal. The treatment was the same as elsewhere, and the only difference consisted in the non-exhibition of the alcohol. Then, again, simple exhaustion, eighty-seven days after the onset of the disease, proved fatal in one instance. The average stay of patients in the hospital would seem to show that convalescence is unduly prolonged, and this notwithstanding the fact that the list of cases comprises several of "nasal catarrh" and other trivial complaints. The only occasion on which alcohol was administered was in a case of operation for strangulated hernia, in which death resulted from an unreduced constriction. Every credit is due to the registrar, Mr. Leopold Hudson, for the clear and practical manner in which he has tabulated and arranged his figures. We shall look forward with interest to future reports drawn upon the same excellent plan, and it is only by comparing results that medical men will be enabled to judge the merits of treatment without alcohol. Thanks to the impartial summary with which the report opens, it is easy to grasp its general tenor. It constitutes an innovation which other hospitals would do well to copy. —*Brit. Med. Journ.*, March 10, 1888.

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### *EFFECT OF COOKING ON THE DIGESTIBILITY OF STARCH.*

In a graduation dissertation for the degree of M.D. in the Military Medical Academy of St. Petersburg, Dr. N. Butiagin gives an account of some experiments he has been carrying out with the view of determining the effect of cooking on the digestibility of starchy foods. He found that the activity of the saliva does not differ much among healthy persons, but that when people are badly nourished and weak, and especially when in addition to this they are suffering from disease of any kind, their saliva has a very perceptibly diminished power of dissolving starch. When starchy substances are subjected to prolonged cooking they become more easily digestible, and in this way compensation can be provided for the inactivity of the saliva of weakly persons. Thus, rice and peas were found to require three hours' cooking in order to render them as easily digested in the saliva of a badly-nourished, nervous, hysterical woman (which had previously been found to possess only eighty-eight per cent. of the normal activity) as they were with a single hour's cooking by the saliva of healthy persons; and generally it was found that in the case of weakly or diseased persons starchy food must be cooked twice or thrice as long as in the case of healthy persons in order that it might be equally acted upon. Again, when starch has been cooked for a long time there is less difference between the effect of healthy and unhealthy saliva upon it; this is specially remarkable in the case of millet, which, after one hour's cooking, showed a difference of 12.89 per cent. in favor of the saliva of healthy as against that of diseased persons, but after three hours' cooking a difference of 5.77 per cent. only.—*Lancet*, March 31, 1888.

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### *THE ERGOT OF OATS.*

While travelling in Oran (Algeria), M. Bousquet (*London Med. Recorder*, March 20, 1888) had an opportunity of examining some ergot from oats. It is an elongated body of a black color, measuring from ten to twelve millimetres in length and three to four in thickness. Its therapeutical effects are as prompt and as lasting as the ergot of rye, but there is, in addition, a general stimulating effect which is useful in the cases of exhaustion following uterine hemorrhage. It was extensively used in Algeria last year on account of the rye famine.

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### *COCAINE AND LANOLIN IN BURNS.*

Dr. Ernst Wende, says the *Pharmaceutische Post* for January 15, 1888, strongly recommends a four per cent. mixture of cocaine and lanolin as an application for burns. Apart from its acting as a good dressing it allays the pain and keeps out the air. Care should be taken that the cocaine is pure and that the mixture is fresh.

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### *HÆMOSTATIC ACTION OF ANTIPYRIN.*

In six cases of blood vomiting, says the *Russk. Med.*, Dr. Olikhow tried inhalations of a watery solution (1 to 10) of antipyrin after all other remedies had failed. The best results followed its use. Simultaneously a fall of temperature was observed.